

TDRSS IV Tin Whisker Risk Assessment Report  
PIA 15598

*Prepared for*

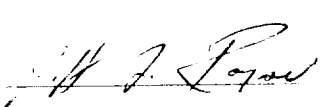
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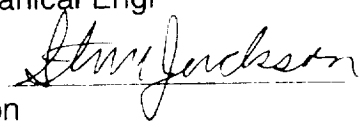
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REPORT DOCUMENTATION PAGE			Form Approved OMB No. 0704-0188	
Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.				
1. AGENCY USE ONLY (Leave blank)		2. REPORT DATE 07/26/2000	3. REPORT TYPE AND DATES COVERED Interim	
4. TITLE AND SUBTITLE <i>TDRSS IV Tin Whisker Risk Assessment Report</i>			5. FUNDING NUMBERS	
5. AUTHORS Ron Zellitti & Jeff Royce MOTOROLA, INC., SSG, SSSD				
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)			8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)			10. SPONSORING/MONITORING AGENCY REPORT NUMBER	
11. SUPPLEMENTARY NOTES Prepared in accordance with Motorola PIA 15598-1000 / MSFC PO #H-32719D				
12a. DISTRIBUTION/AVAILABILITY STATEMENT  Various			12b. DISTRIBUTION CODE	
13. ABSTRACT (Maximum 200 words) This report documents the plating requirements for the electrical and mechanical parts used in the TDRSS IV transponder manufactured by MOTOROLA, INC., SSG, SSSD. The intent of this report is to identify any electrical, electromechanical or mechanical part that does not have adequate requirements to prevent the use of a pure tin finish.				
14. SUBJECT TERMS			15. NUMBER OF PAGES 92 pages with appendix	
			16. PRICE CODE	
17. SECURITY CLASSIFICATION OF REPORT unclassified	18. SECURITY CLASSIFICATION OF THIS PAGE unclassified	19. SECURITY CLASSIFICATION OF ABSTRACT unclassified	20. LIMITATION OF ABSTRACT SAR	

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## 1.0 Scope

This report documents the plating requirements imposed upon the parts for the TDRSS IV Transponder, developed and manufactured for GSFC, by Motorola Space Systems and Service Division. The intent of this report is to review and document the electrical and mechanical part requirements to identify any risk of having a pure tin finish on any of these parts.

It should be noted that the purchase orders, for all parts requiring plating, procured for TDRSS IV, include the note shown below. This note prohibits the use of pure (unalloyed) tin finish on all surfaces.

Motorola is confident that no parts with exposed pure tin are contained in the TDRSS IV transponders. However, Motorola is aware that, on some other programs, parts with pure tin finish have been identified, even though, the requirement for no tin finish was imposed. Therefore we have provided within this report, an analysis of the risk of pure tin finish, for all parts in the TDRSS IV transponder.

### 1.1 Report Structure

This report is divided into the following sections:

2. Summary of the plating requirements for electrical components and risk assessment.

3. Detailed finish requirements for each of the electrical parts.

Appendix A: Summary by part number with the quantity used per assembly for the electrical components.

Appendix B: Mechanical parts

### 1.2 Potential Risk Parts

Risk parts are categorized based upon the imposed requirements in their procurement specifications in an ascending order (E.G., 1 is considered no risk since the finish has been verified).

- 1: Parts that have the finish verified during Destructive Physical analysis on sample parts.
- 2: Parts procured to a Military Specification with a QML listing (qualified parts) that have a statement that prohibits the use of pure

tin and defines the finish as part of the part number in the Military Specification.

- 3: Parts that define the plating finish in their procurement specification, but do not specifically prohibit the use of a pure tin finish.
- 4: Parts that define the lead finish as other than pure tin in the procurement specification, but allow the use of a pure tin finish as part of the process. The manufacturer may have a pure tin finish plating that is used on some product. Having this capability as part of the manufacturing process generates a risk that the non-tin plated parts could receive the wrong process.
- 5: Parts that do not specify the lead finish or specifically prohibit the use of pure tin as a finish.

All of the above risks are reduced on the TDRSS IV Transponder program by the following Purchase Order (PO) note that was imposed by the program Material Supplier Quality Requirements document.

PROJECT NOTE NO./REV	CATEGORY NUMBER	NO. OF VARIABLES	NOTE TEXT
391 A, 6/92	<u>5</u> PO/RECVR	0	The use of pure (unalloyed) tin finish is prohibited on all surfaces. This includes leads that are subsequently hot solder dipped unless dipped all the way to the body.
<p>This note is for use by projects that are either contractually required or choose to ban the use of pure tin (electroplated, fused or hot dipped) altogether. ***The project QATM and RPE are responsible for reviewing their parts lists for applicability of this note to specific parts. ***The QATM is responsible for adding this note against the applicable parts in the MSQR. *** The project team is also required to evaluate and make documented decisions when parts with "NO TIN" are not readily available to meet the project needs.</p>			

## 2.0 Requirement Summary

A summary of the tin plating requirements for each of the component types is delineated in the following tables.

### Resistors

Type	Mil-Specification	Tin plating prohibited	Finish specified	Details in paragraph	Risk
Thermister	GODDARD 311P18	No	Yes	3.1	3
RM	MIL-PRF-55342G	No	Yes	3.2	3
RWR	MIL-PRF-39007H	Yes	No	3.3	3
RTR	MIL-PRF-39015D	Yes	No	3.4	3
RLR	MIL-PRF-39017F	Yes	No	3.5	3
RNC	MIL-PRF-55182G	Yes	Yes 1/	3.6	3
RZ	MIL-PRF-83401G	Yes	No	3.7	3

1/ C31 is specified in MIL-PRF-55182G as a finish option, but finish 31 is no longer listed in the reference specification in MIL-STD-1276G. MIL-STD-1276G is referenced by MIL-PRF-55182G for lead finish definition.

### Capacitors

Type	Mil-Specification	Tin plating prohibited	Finish specified	Details in paragraph	Risk
CDR	MIL-PRF-55681	No	Yes	3.8	3
Ceramic switch mode	MIL-C-39014E	Yes	No	3.9	3
CWR	MIL-PRF-55365D	Yes	Yes	3.10	2

**Inductors/Transformers**

Type	Mil-Specification MOTOROLA INC. drawing	Tin plating prohibited	Finish specified	Details in paragraph	Risk
Line make inductors	J-W-1177 – Wire	No	Yes	3.11.1	3
	MOTOROLA INC. drawing 74-P16553A – Coil form	No	Yes	3.11.2	3
	MOTOROLA INC. drawing 74-P16553A - Coil form, two hole bead	No	Yes	3.11.3	3
MOTOROLA INC. IDF TRANSFORMERS/ INDUCTORS	Magnetics Catalog - core	No	Yes	3.12.1	3
	Phillips Catalog – core	No	Yes	3.12.2	3
	J-W-1177 – Wire	No	Yes	3.12.3	3
	MIL-W- 22759/11- Wire	No	Yes	3.12.4	3
Screened M83446/11 Inductors	24-P40313E	No	Yes	3.13	3
Screened M83446/9 Inductors	24-P40317E	Yes	Yes	3.14	2
Screened M21038/27-27 Transformer	24-P48640E	No	No	3.15	5



**Electrical Connectors**

Type	Mil-Specification Drawing No	Tin plating prohibited	Finish specified	Details in paragraph	Risk
SMA	22MCX5002/111S SG, SSSD	No	Yes	3.16	3
SMT plug	2367-0000-54	No	Yes	3.17	3
RF, TRIAXIAL	28-P38549Y001	No	Yes	3.18	3
Coaxial Subminiature SMA and Pin	28-P39895Pxxx	No	Yes	3.19	3
Programming	28-P40036E001	No	Yes	3.20	3
Microminiature	M83513/03-X0XN	No	Yes	3.21	3
Microminiature	M83513/04-X0XN	No	Yes	3.22	3
Jack post assy	M83513/5	No	Yes	3.23	3

**Transistors and Diodes**

Type	Mil-Specification Drawing No	Tin plating prohibited	Finish specified	Details in paragraph	Risk
Transistor	2223-1.7	No	No <u>1</u> /	3.24	1
Transistor	2223-9AHV	No	No <u>1</u> /	3.25	1
Transistor	48-P24290N	Yes (Case)	Yes (Leads)	3.26	2
Transistor	48-P40301E	Yes	Yes	3.27	2
Transistor	48-P40305E	Yes	Yes	3.28	2
Transistor	48-P40309E	No	No <u>1</u> /	3.29	1
Transistor	48-P49941D	No	Yes <u>1</u> /	3.30	1
Diode, Detector	DDC4717-89	No	Yes <u>1</u> /	3.31	1
Diode	DSB4773-66	No	No <u>1</u> /	3.32	1
Diodes	JANTXV1NxxxxU x (-1)	Yes	Yes	3.33	2
Diode, Detector	MA40258-276TXV	No	No <u>1</u> /	3.34	1
Diode, Varactor	MA45233-94TXV	No	No <u>1</u> /	3.35	1
Diode, Varactor	MA4ST563-94TXV	No	No <u>1</u> /	3.36	1

1/ Lead and package finish identified as gold in DPA report.

**Integrated Circuits**

Type	Mil-Specification Drawing No	Tin plating prohibited	Finish specified	Details in paragraph	Risk
MMIC	51-P24339N002	No	Yes	3.37	3
MMIC	51-P24339N003	No	Yes	3.38	3
ASIC	51-P34222W001	No	Yes <u>1</u> /	3.39	1
AD9720TQ/883	51-P34227W001	No	Yes	3.40	3
ASIC	5962R96b0207	No	Yes <u>1</u> /	3.41	1
SG1846F	51-P40306E001	No	No <u>2</u> /	3.42	4
54ACT574 54ACT240 LM108W LM124W 54AC32 54AC14 54AC244 OP27 54AC86	51-P40306E 004 006 008 009 010 011 012 020 021	No	Yes	3.43	3
AD9696 UT63M147CBA CLC505	51-P40306E 005 019 015	No	Yes	3.44	3
RFIC	51-P40311E001	Yes	Yes <u>1</u> /	3.45	1
HS1-5104RH-Q	51-P40312E001	No	Yes <u>1</u> /	3.46	1
Upconverter	51-P40322E001	No	Yes <u>1</u> /	3.47	1
HS9-26C32 HS9-26C31	5962F9568901VXC 5962F9666301VXC	No	Yes	3.48	3
AM85-0007-S	AM85-0007-S	No	Yes <u>1</u> /	3.49	1
ESN MCM	GSFC-735-2827-01	No	Yes <u>1</u> /	3.50	1
Oscillator	MCM2760-8M	No	Yes <u>1</u> /	3.51	1

1/ Lead and package finish identified as gold in DPA report.

2/ Tin plating allowed by procurement specification if the plating is fused.

**Attenuator/Isolators/Sampling Phase Detectors/Mixer**

Type	Mil-Specification Drawing No	Tin plating prohibited	Finish specified	Details in paragraph	Risk
Isolator	58-P34232W001	No	Yes	3.52	3
TVAXX00X0XW3S	60135650XX	No	Yes	3.53	3
TX03XXW3S	60136450XX	No	No	3.54	5
Mixer	DMG-2BXXXXX	No	No	3.55	5
SPD3510	SPD3510-90	No	Yes <u>1</u> /	3.56	1
SR8800	SR8800SPQxxxBY	No	Yes	3.57	3

**3.0 Material Finish Electrical Parts**

The material finish requirements for each of the applicable part numbers/specifications is shown in the following paragraphs

**3.1 Thermister, NTC , 06-P34234W00X AND 311P18-XXT7R6**

The MOTOROLA INC. source control drawing, 06-P34234W , refers to GODDARD Space Flight Center specification S-311-P-18 for resistor design and construction. The MOTOROLA INC. source control drawing does not specify the lead termination or prohibit the use of a pure tin finish. GODDARD Space Flight Center specification S-311-P-18 specifies the following requirements for lead finish.

Lead code	S	T	N	E
Lead Style	32 AWG, type C per MIL-STD-1276	28 AWG, type ET per MIL-W-16878	32 AWG, type N-2 per MIL-STD-1276	Insulated lead – TFE 32 AWG per MIL-I-22129  Bare lead –S; tubing-FEP, M23053/11-105C

The lead codes are defined in paragraph 3.4 of GODDARD Space Flight Center specification S-311-P-18 as follows:

- S     copper wire
- N     nickel wire
- T     teflon insulation both ends
- E     teflon incased, teflon insulation one lead

## 3.2 RM Resistors, MIL-PRF-55342G, Dated 3 July 1997

The termination finish is defined by the part number as shown below:

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SUPERSEDING  
MIL-R-55342F  
28 June 1995

PERFORMANCE SPECIFICATION

RESISTORS, FIXED, FILM, CHIP,  
NONESTABLISHED RELIABILITY, ESTABLISHED RELIABILITY, SPACE LEVEL,  
GENERAL SPECIFICATION FOR

This specification is approved for use by all Departments  
and Agencies of the Department of Defense

1. SCOPE

1.1 Scope. This specification covers the general requirements for nonestablished reliability (non-ER), established reliability (ER), and space level, fixed, film, chip resistors primarily intended for incorporation into surface mount applications. These resistors have a high degree of stability with respect to time under normal conditions. ER resistors covered by this specification have life failure rates (FR) ranging from 1 percent to 0.001 percent per 1,000 hours (see 1.2.7). These FRs are established at 60 percent confidence on the basis of life tests. Table I provides a summary of performance characteristics for these resistors.

1.2 Classification.

1.2.1 Part or Identifying Number (PIN). Resistors specified herein (see 3.1) are identified by a PIN which consists of the basic number and the associated specification. Each associated specification covers a different resistor style. The PIN provides information concerning the resistor characteristic, resistance value, resistance tolerance, termination material, and product designator. The PIN is in the following form:

M55342	H	01	B	1E00	M
Specification indicating MIL-PRF-55342	Characteristic (see 1.2.3)	Specification sheet number indicating MIL-PRF-55342/1	Termination material (see 1.2.4)	Resistance and resistance tolerance (see 1.2.5)	Product level designator (see 1.2.7)

The lead termination material is defined in MIL-PRF-55342G, paragraph 1.2.4:

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MIL-PRF-55342G

1.2.4 Termination material. The termination material designation will be in accordance with table II.

TABLE II Termination materials

Type	Material	Termination area	Code letters
Wire bondable	Gold	One surface Bonding pads	W 1/ P
Solderable 2/	Best metallization barrier metal solder coated	Wraparound 3/	B
Epoxy bondable	Gold	Wraparound 2/	G
	Platinum gold	Wraparound 3/ One surface	U T 1/
	Palladium/silver or Platinum/silver	Wraparound 3/	C
	Palladium/silver or Platinum/silver	One surface	D 1/

1/ See 6.4.4.  
2/ Solderable termination is will be pretinned for solder reflow operation and will meet the solderability test. The pretinning will be, as a minimum, on at least the bottom and ends of the chip and only those surfaces must meet the solderability test (see figure 2).  
3/ Wrap-around type will be illustrated on the associated specifications.

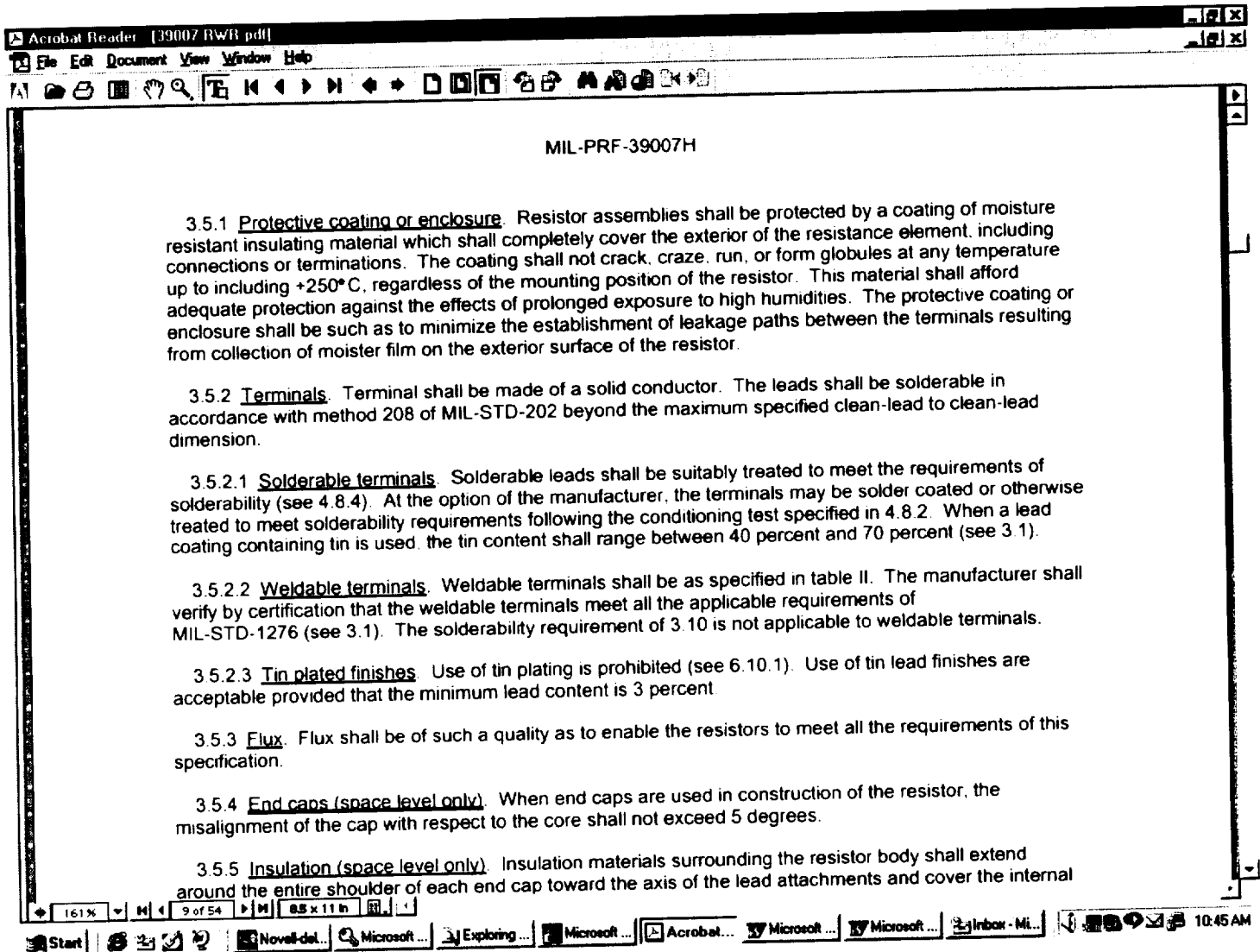
1.2.5 Resistance. The nominal resistance expressed in ohms is identified by four characters consisting of three digits and a letter. The letter is used simultaneously as a decimal point, multiplier, and a resistance tolerance designator. For resistance values:

MIL-PRF-55342G does not specifically prohibit the use of pure tin.

### 3.3 RWR Resistors, MIL-PRF-39007H, Dated 3 July 1997

MIL-PRF-39007H does not specify the lead finish material, but it does prohibit the use of pure tin.

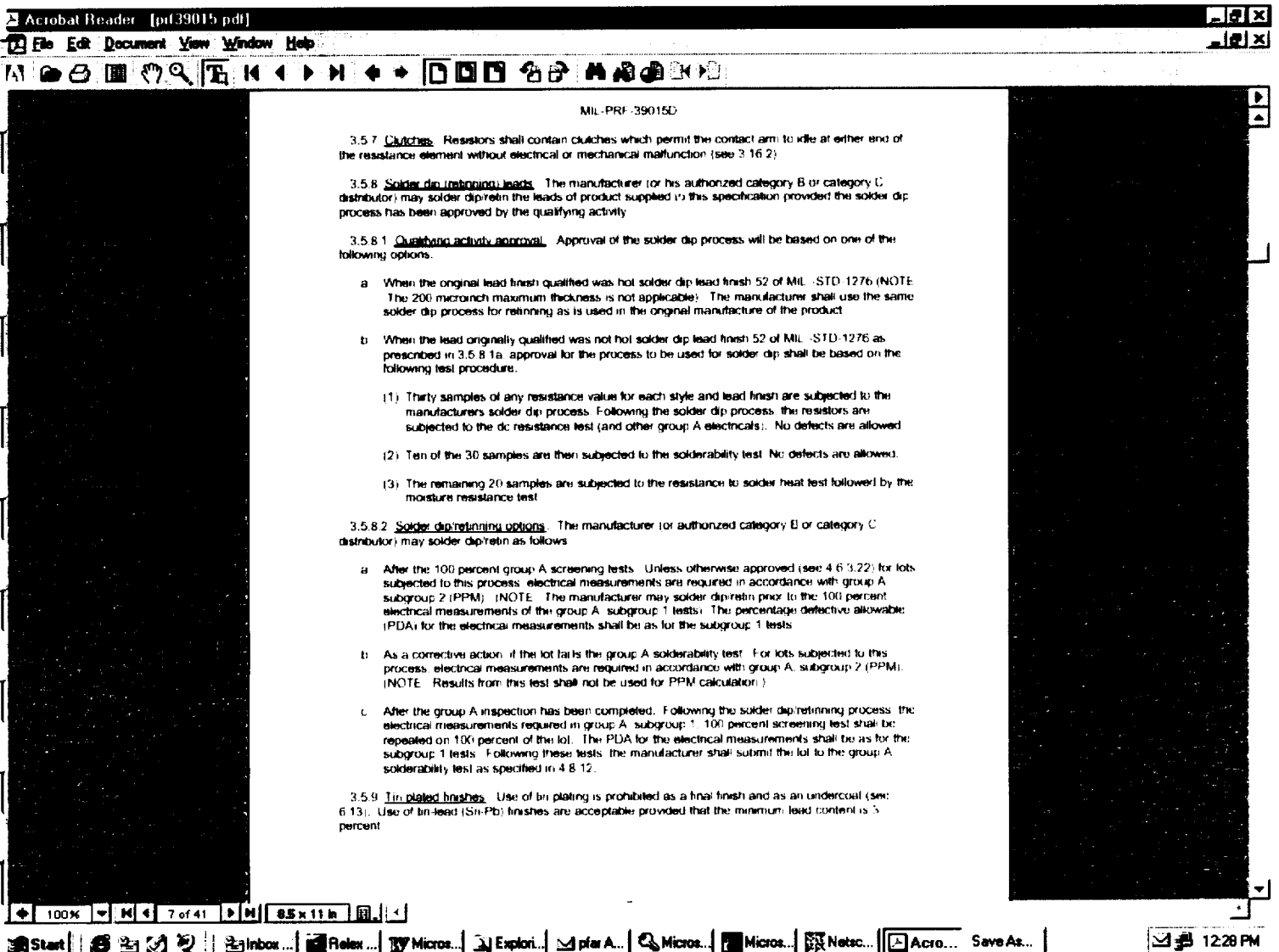
*"3.5.2.3 Tin plated finishes. Use of tin plating is prohibited (see 6.10.1). Use of tin lead finishes are acceptable provided that the minimum lead content is 3 percent."*



## 3.4 RTR Resistors, MIL-PRF-39015D, Dated MAY 1997

MIL-PRF-39015D specifically prohibits the use of tin plated finishes, but does not define the specific finish to be used.

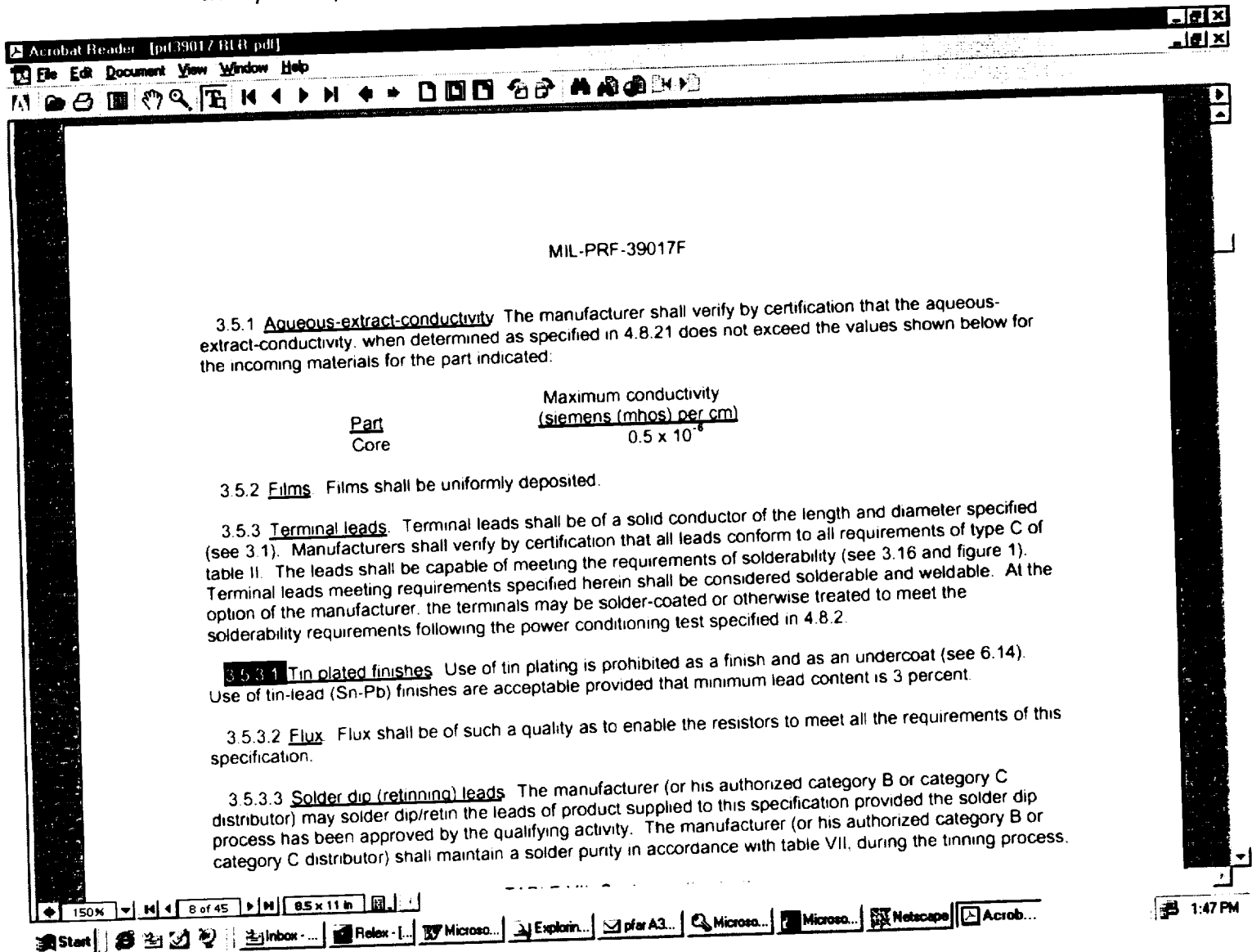
*Ref: "3.5.9 Tin plated finishes. Use of tin plating is prohibited as a final finish and as an undercoat (see 6.13). Use of tin-lead (Sn-Pb) finishes are acceptable provided that the minimum lead content is 3 percent."*



## 3.5 RLR Resistors, MIL-PRF-39017F, Dated 1997

MIL-PRF-39017F does not specify the lead finish, but it does prohibit the use of pure tin.

*Ref: "3.5.3.1 Tin plated finishes. Use of tin plating is prohibited as a finish and as an undercoat (see 6.14). Use of tin-lead (Sn-Pb) finishes are acceptable provided that minimum lead content is 3 percent."*



## 3.6 Resistor, RNC, MIL-PRF-55182G, Dated 9 JUNE 1997

MIL-PRF-55182G specifies the lead finish by referencing MIL-STD-1276

MIL-PRF-55182G

TABLE I. Terminal type.

Symbol	Terminal
RNR 1/ RNC 2/	Solderable Solderable/weldable (type C31, C32, or C52 3/) of MIL-STD-1276
RNN	Weldable (type N22 of MIL-STD-1276)

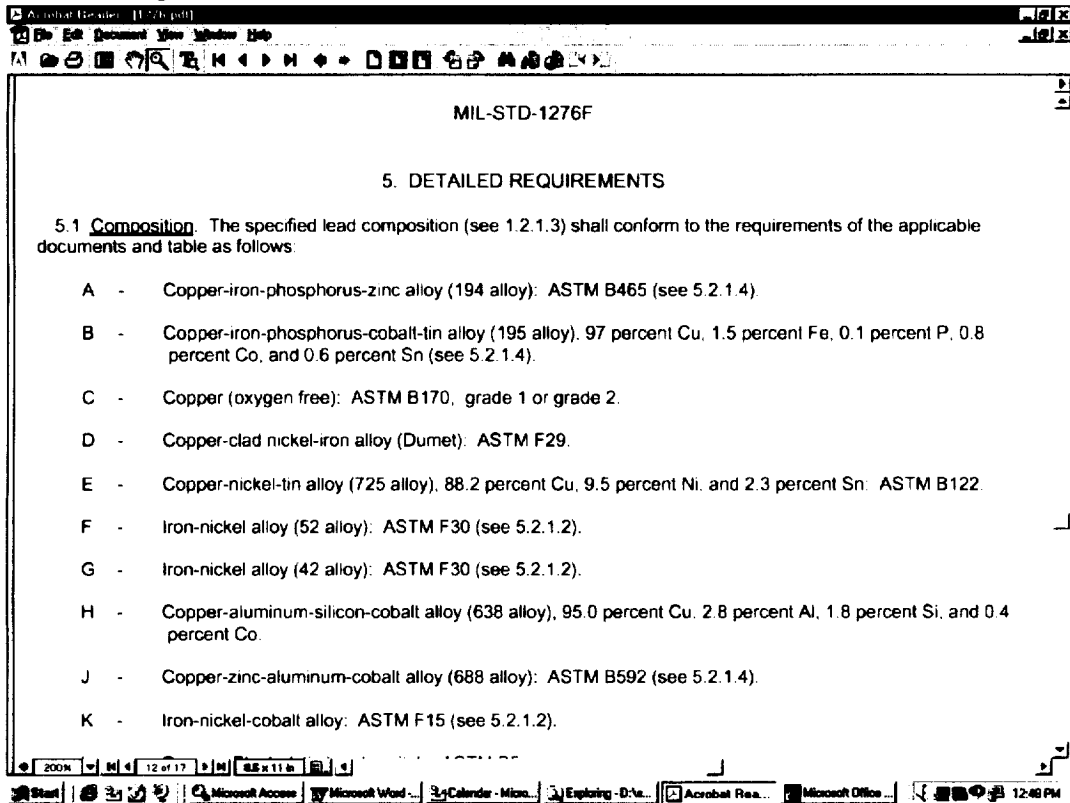
1/ Terminal type RNR is inactive for new design when specified with characteristics H, J, and K only. Terminal RNR remains active for Characteristic C and E. (see 6.5).

2/ Terminal type RNC is inactive for new design when specified with characteristics C and E only. Terminal RNC remains active for Characteristics H, J, and K. (see 6.5).

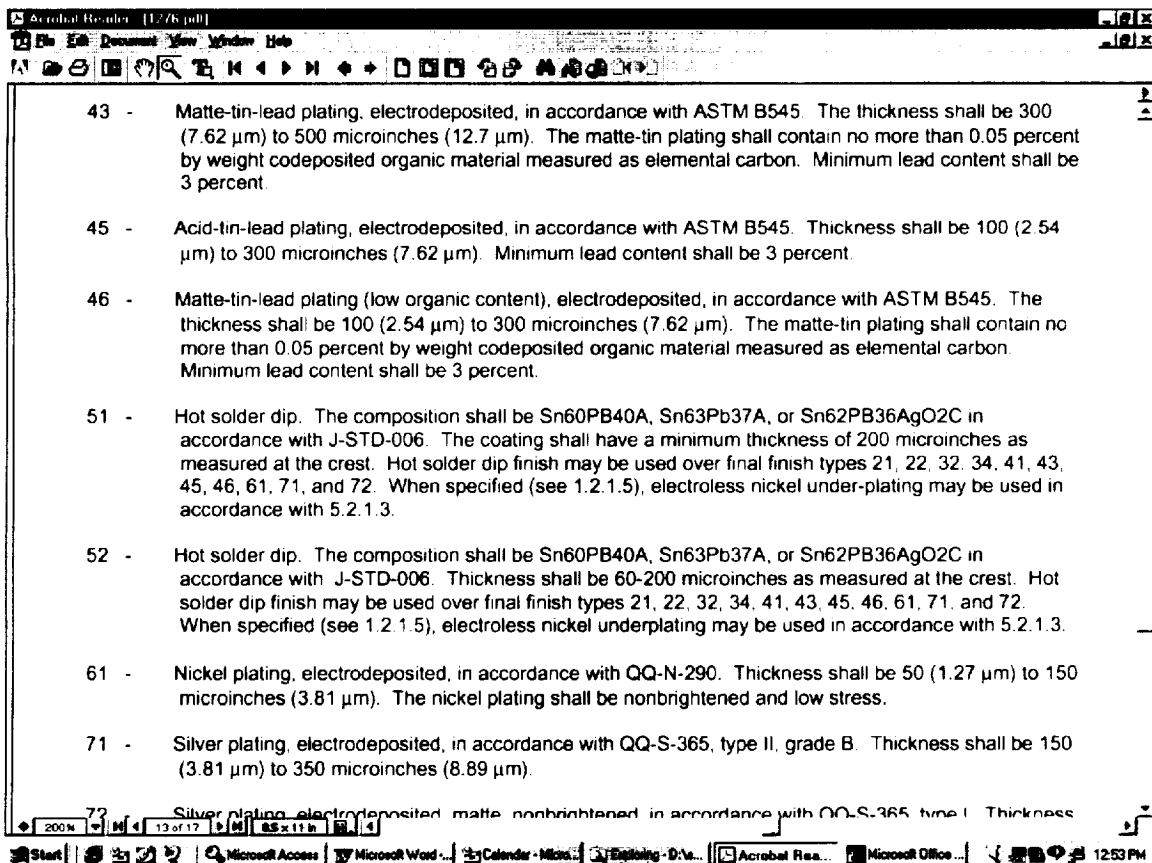
3/ The maximum thickness of 200 microinches is not applicable.

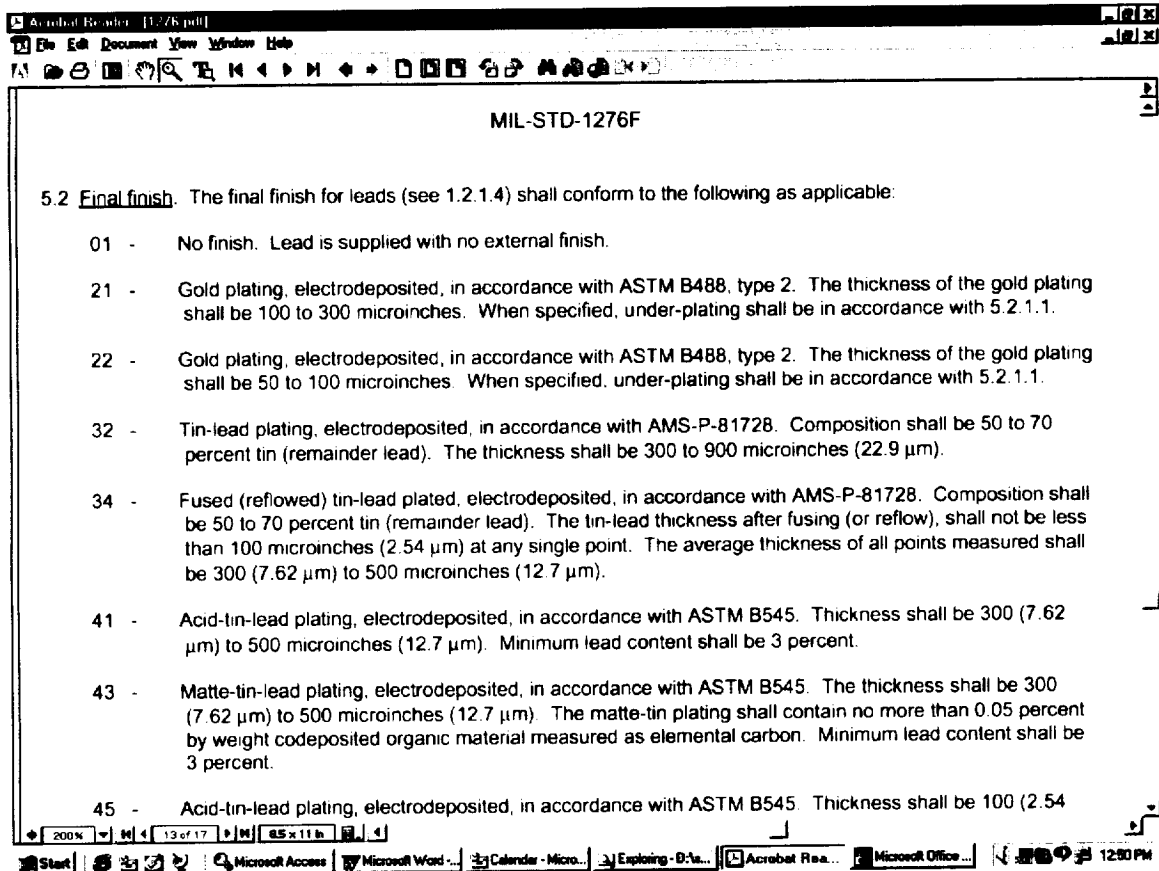


The C designates the base lead material.



And the two digit number specifies the finish.

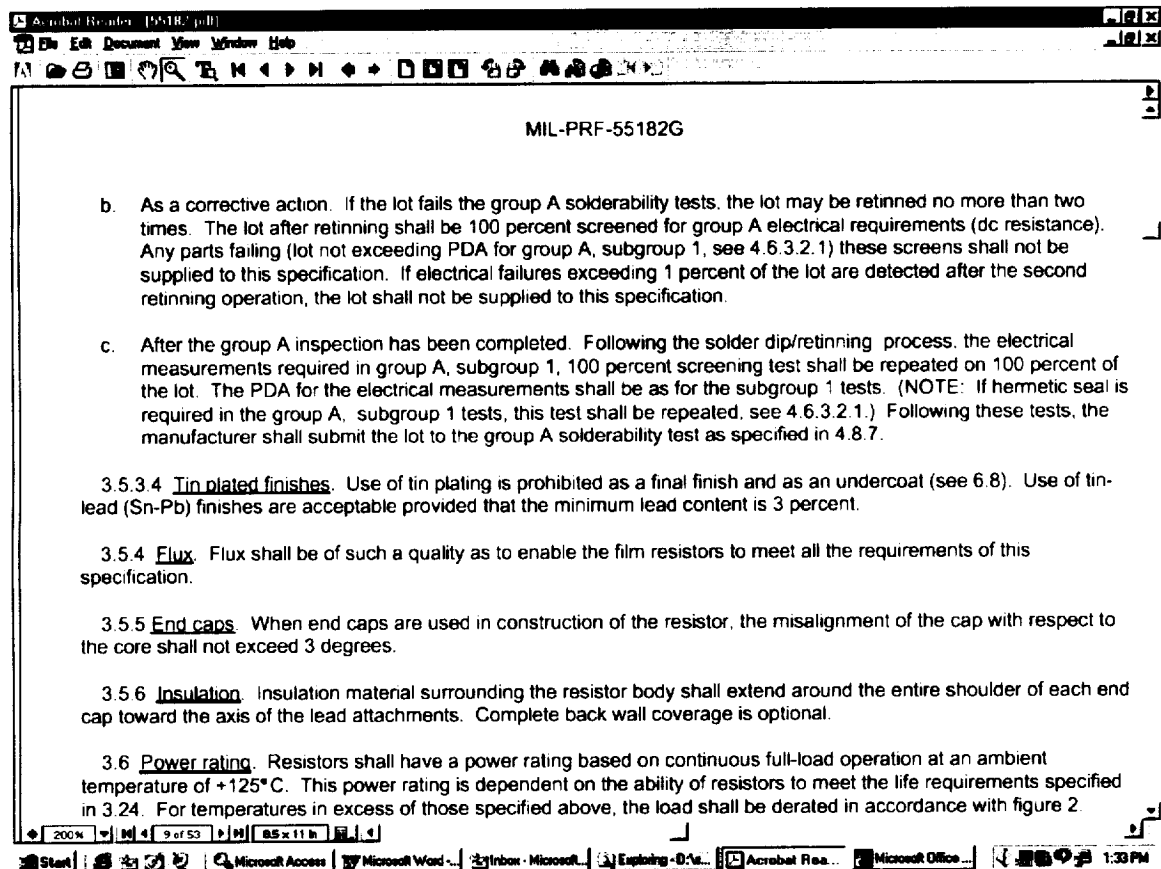




Finish 31 is no longer available on the current revision of the specification.

MIL-PRF-55182G prohibits the use of pure tin.

*Ref: 3.5.3.4 Tin plated finishes. Use of tin plating is prohibited as a final finish and as an undercoat (see 6.8). Use of tin-lead (Sn-Pb) finishes are acceptable provided that the minimum lead content is 3 percent.*



## 3.7 Resistor, RZ, MIL-PRF-83401G, Dated 18 MARCH 1996

MIL-PRF-83401G does not specify the lead finish, but it does prohibit the use of pure tin.

*Ref: 3.4.6 Tin plated finishes. Use of tin plating is prohibited (see 6.4.3.1). Use of tin-lead finishes are acceptable provided that the minimum lead content is 3 percent.*

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3.4.3 Internal visual inspection (applicable to characteristics C and V). Networks meeting the requirements of characteristics C and V shall be subjected to a precap visual inspection that shall require as a minimum, the following inspections:

- Inspection of internal connections.
- Inspection of metallization.
- Inspection of die mounting.
- Inspection for foreign or extraneous material.

3.4.4 Metallization resistance. The resistance of the metallization of the longest path in the network shall not exceed the limits in table VI.

TABLE VI. Metallization resistance.

Nominal element resistance value (ohms) R	Maximum metallization resistance (ohms) R
$R \leq 1,000$	1
$1,000 < R < 10,000$	5
$R \geq 10,000$	10

3.4.5 Soldering. If soldering is used for internal connections, it shall be of such a quality as to enable the networks to meet all the requirements of this specification, and having a liquid point not less than +280°C.

3.4.5.1 Bonding. If thermo-compression bonding is used for internal connections, a gold bond shall form a solid phase weld (see 3.1).

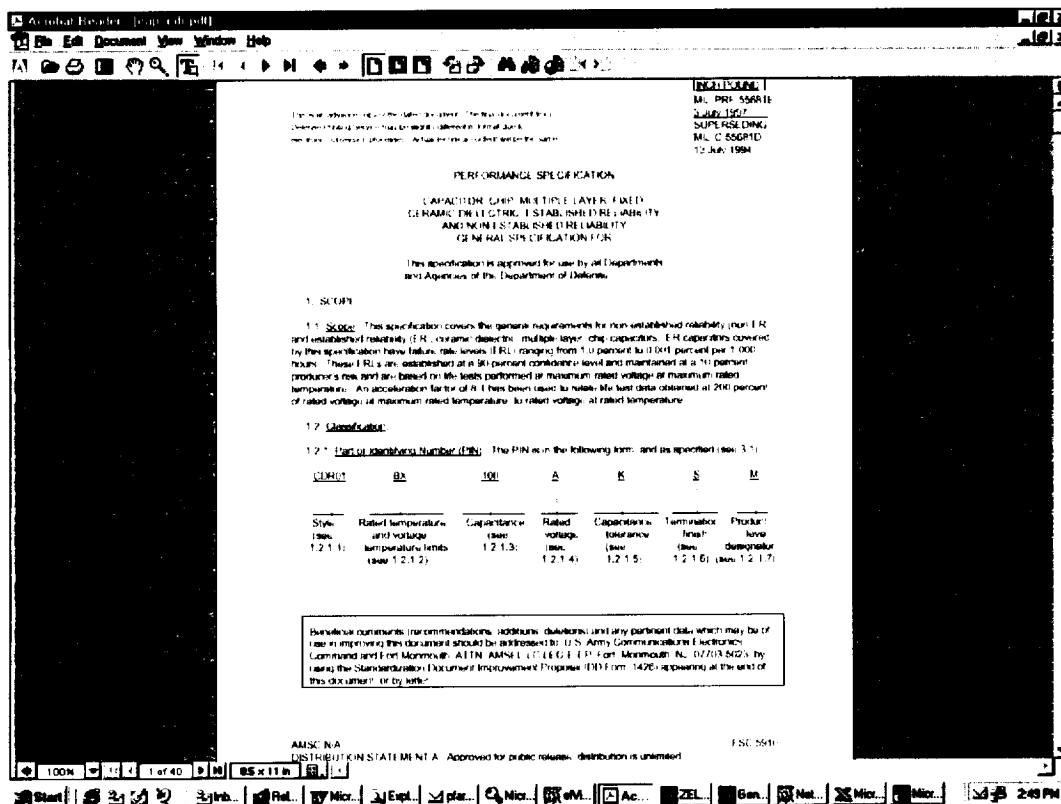
3.4.6 Tin plated finishes. Use of tin plating is prohibited (see 6.4.3.1). Use of tin-lead finishes are acceptable provided that the minimum lead content is 3 percent.

150% 12 of 52 8.5 x 11 in

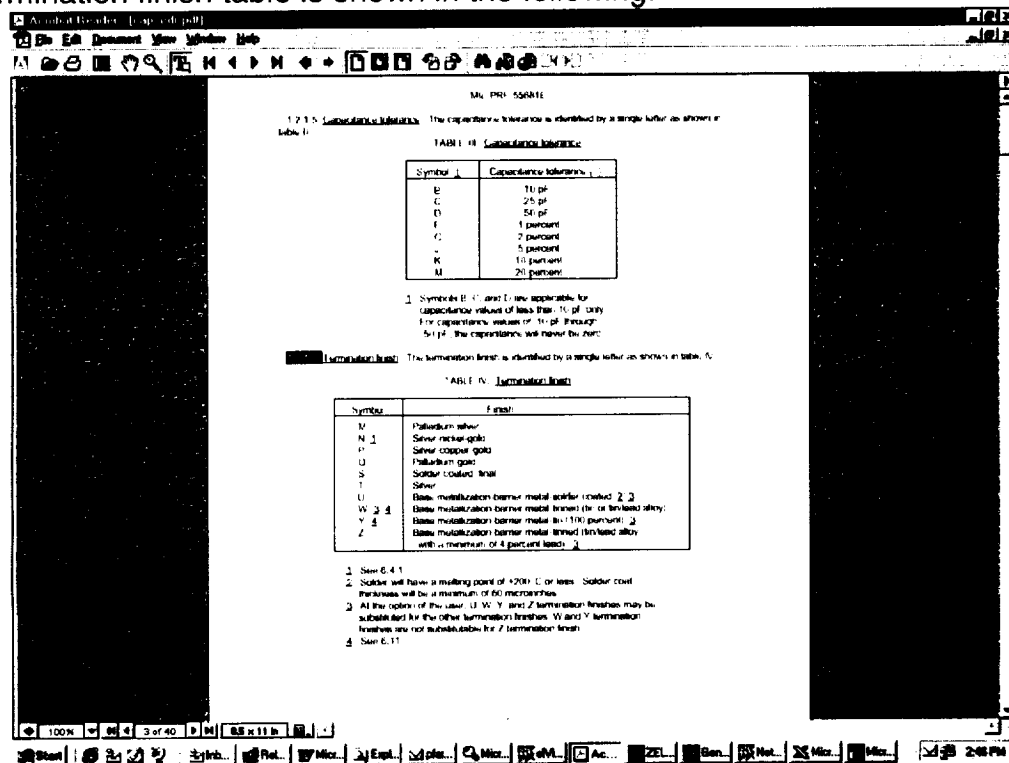
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### 3.8 Capacitors (21-P40307EXXX): Make from part number CDRXXXXXXXX (MIL-PRF-55681)

The use of pure tin finish is not prohibited by MIL-PRF-55681, but the lead finish is specified. The next to the last letter in the CDR (MIL-PRF-55681) part number determines the termination finish of the capacitor.



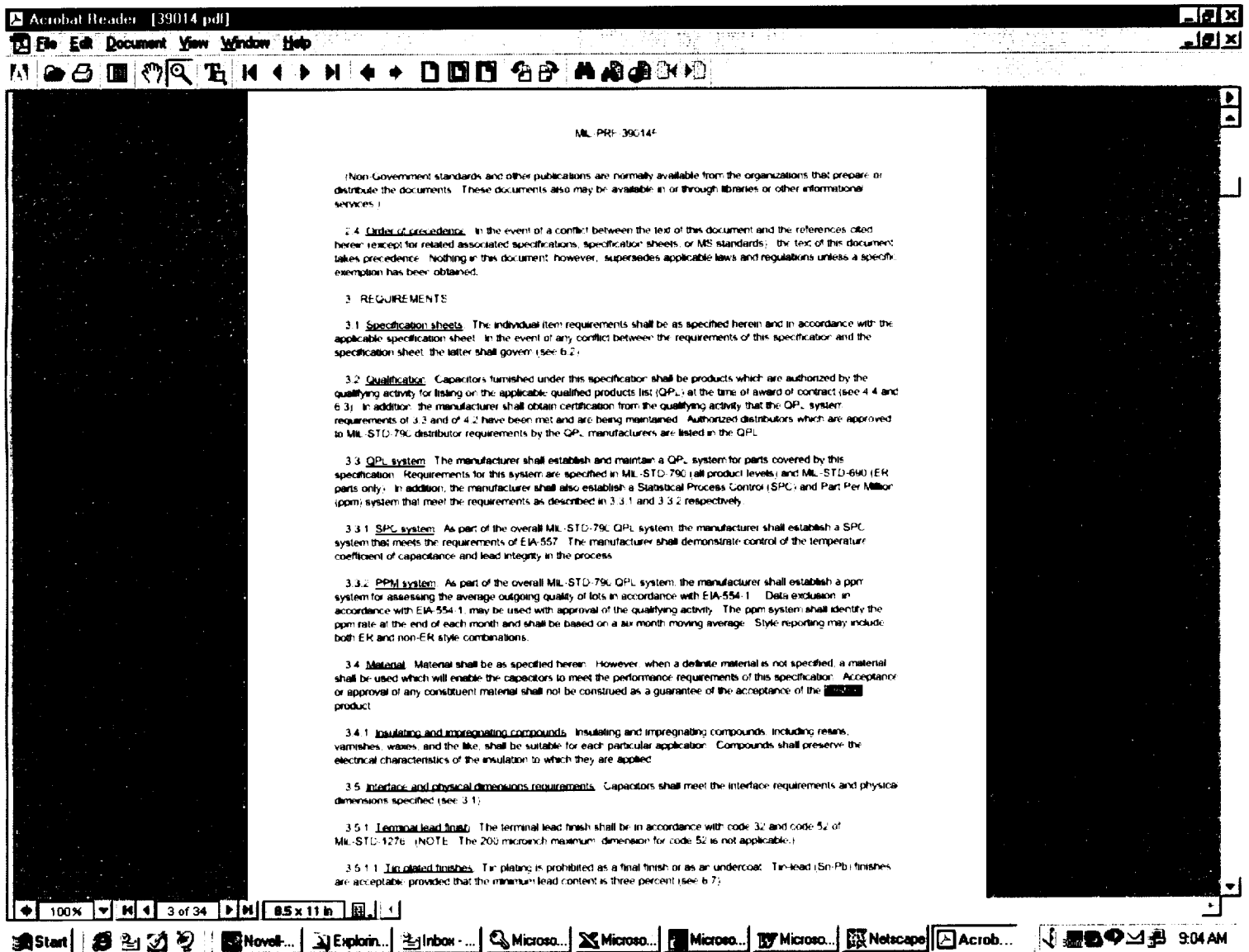
The termination finish table is shown in the following:



### 3.9 Capacitor, 87106, MIL-C-39014E , Dated DECEMBER 1990

Ceramic switch mode power supply capacitors are designed and manufactured in accordance with DESC SMD 87106. The case for these capacitors is multi-layer, unencapsulated, monolithic. The lead finish is referred to MIL-C-39014E. MIL-C-39014E does not specify the lead finish, but it does prohibit the use of a pure tin finish.

*Ref: 3.5.1.1 Tin plated finishes. Tin plating is prohibited as a final finish or as an undercoat. Tin-lead (Sn-Pb) finishes are acceptable provided that the minimum lead content is three percent (see 6.7).*



### 3.10 Capacitor, CWR, MIL-PRF-55365D, Dated 3 JULY 97

The use of pure tin finish is prohibited by MIL-PRF-55365D.

*Ref: "3.5.2.3 Tin plated finishes. Tin plating is prohibited as a final finish or as an undercoat. Tin-lead (Sn-Pb) finishes are acceptable provided that the minimum lead content is 3 percent (see 6.10)."*

The termination finish is specified in the CWR part number.

MIL-PRF-55365D

1.2 Classification. Capacitors covered by this specification are classified by style as specified (see 3.1)

1.2.1 Part or Identifying Number (PIN). The PIN should be in the following form and as specified (see 3.1)

CWR06

Style  
(1.2.1.1)

B

Voltage  
(1.2.1.2)

A

Termination  
finish  
(1.2.1.3)

225

Capacitance  
(1.2.1.4)

J

Capacitance  
tolerance  
(1.2.1.5)

A

Product  
level  
designator  
(1.2.1.6)

1.2.1.1 Style. The style is identified by the three-letter symbol "CWR" followed by the two digit number. The letters identify tantalum chip capacitors. The number identifies the design of the capacitor.

1.2.1.2 Voltage. The voltage (rated, derated, and surge) is identified by a single letter as shown in table I.

TABLE I. Voltage

Symbol	Voltage		
	Rated (+85° C)	Derated (+125° C)	Surge (+85° C)
	<u>Volts, dc</u>	<u>Volts, dc</u>	<u>Volts, dc</u>
A	2	1.3	2.6
B	3	2.0	4.0
C	4	2.7	5.0
D	6	4.0	8.0
E	8	5.4	10.0
F	10	7.0	13.0
G	15	10.5	16.5

MIL-PRF-55365D defines the lead termination finish as:

*1.2.1.3 Termination finish. The termination finish is identified by a single letter as follows:*

*B - Gold plated (50 microinch minimum).*

*C - Hot solder dipped (60 microinch minimum).*

*H - Solder plated (100 microinch minimum).*

*K - Solder fused (60 microinch minimum).*



### 3.11 Line Make Inductors , 24-P40011EXXX

The 24-P40011Exxx are line make inductors. The inductors are open coil (E.G., non-molded) built on the production line as required by the module's circuit tuning. The line make inductors consist of the following parts:

FIND #	QTY REQ'D	PART OR IDENTIFYING#	NOMENCLATURE DESCRIPTION	SUPPLEMENTARY PART OR IDENTIFYING #
68	AR	30-P34069D130A	WIRE, ELEC-MAGNET #30 RED	M1177/9-02C 030
69	AR	30-P34069D134A	WIRE, ELEC-MAGNET #34 RED	M1177/9-02C 034
75	AR	30-P34069D126A	WIRE, ELEC-MAGNET #26 RED	M1177/9-02C 026
76	AR	30-P34069D132A	WIRE, ELEC-MAGNET #32 RED	M1177/9-02C 032
77	AR	30-P34069D634C	WIRE, ELEC-MAGNET BIFILAR #34	M1177/9-02C 034
78	AR	30-P34069D136A	WIRE, ELEC-MAGNET #36 RED	M1177/9-02C 036
79	AR	30-P34069D136B	WIRE, ELEC-MAGNET #36 GREEN	M1177/9-02C 036
130	3	74-P16553A074	COIL FORM	T12-17 MICROMETALS
131	20	74-P16553A027	COIL FORM	T20-0 MICROMETALS
132	1	74-P32317M001	COIL FORM,TWO HOLE BEAD	2843002402 FAIR-RITE
133	2	74-P32317M002	COIL FORM,TWO HOLE BEAD	2843002302 FAIR-RITE
134	1	74-P16553A077	COIL FORM	T25-17 MICROMETALS
135	1	74-P16553A033	COIL FORM	T25-0 MICROMETALS

#### 3.11.1 Wire, Elec-Magnet

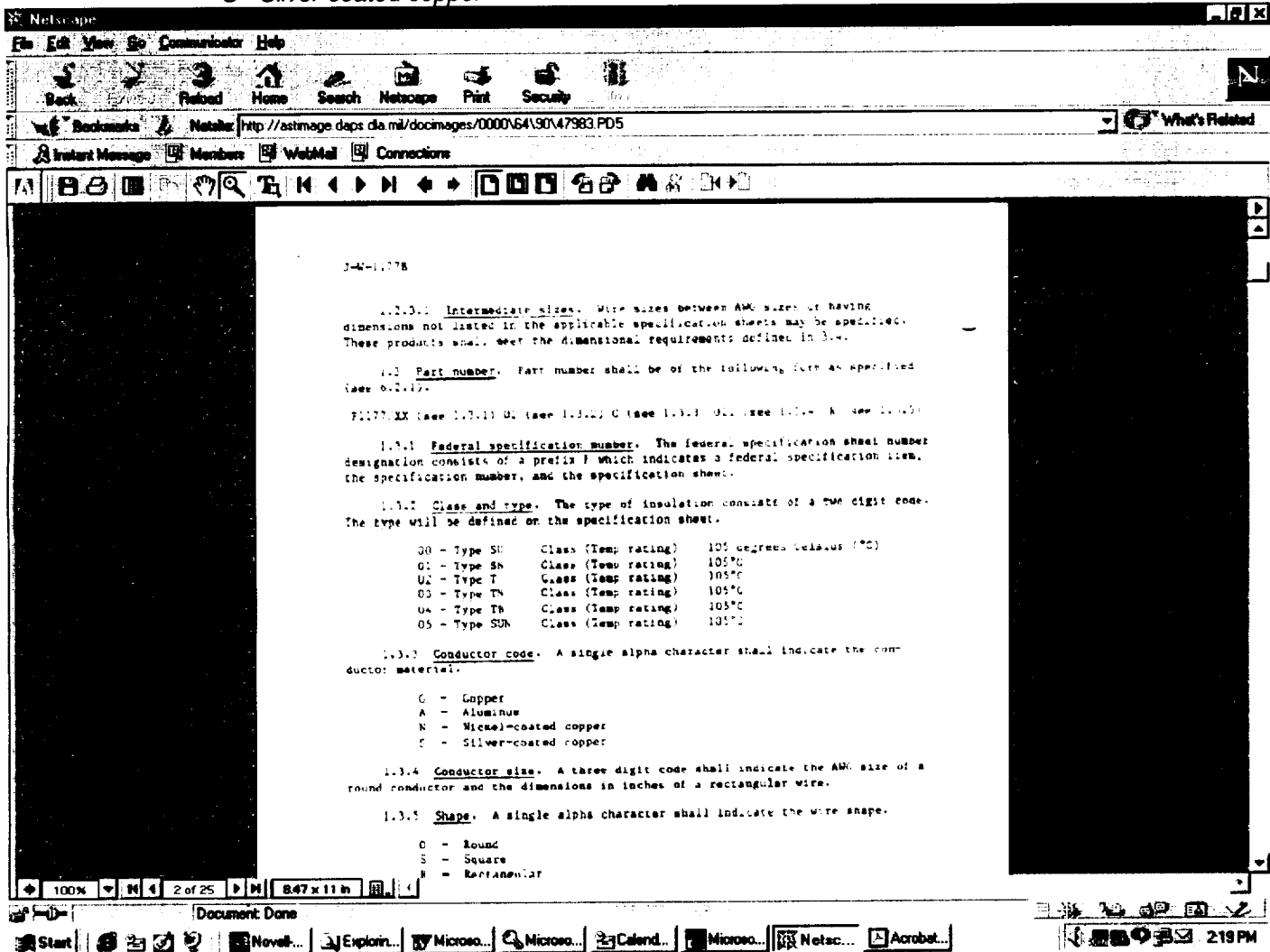
The WIRE, ELEC-MAGNET is procured in accordance with MOTOROLA INC. drawing number 30-P34069D, MAGNET WIRE, SINGLE CONDUCTOR AND BIFILAR, ROUND, MATERIAL REQUIREMENTS FOR. MOTOROLA INC. Drawing number 30-P34069D defines the material properties of the wire in the following paragraph, 3.1.

#### *"3.1 MATERIAL PROPERTIES*

*THE MATERIAL PROPERTIES SHALL BE IN ACCORDANCE WITH J-W-1177/9, /10, /39, /40, /42 EXCEPT THAT THE MATERIAL SHALL BE THE COLORS SHOWN IN TABLES I AND II."*

J-W-1177 requires the following conductor core materials:

*1.3.3 Conductor code. A single alpha character shall indicate the conductor material.*  
*c - Copper*  
*A - Aluminum*  
*N - Nickel-coated copper*

*S - Silver-coated copper*

The elec-magnet wire is coated in accordance with the following paragraph from J-W-1177:

1.3.2 Class and type. The type of insulation consists of a two digit codes  
The type will be defined on the specificationsheet.  
00 - Type SU Class (Temp rating) 105 degrees Celsius (°C)  
01 - Type SN Class (Temp rating) 105°C  
02 - Type T Class (Temp rating) 105°C  
03 - Type TN Class (Temp rating) 105°C  
04 - Type TB Class (Temp rating) 105°C  
05 - Type SUN Class (Temp rating) 105°C

Both ends of the wire are stripped and solder coated with SN62WRP3 solder prior to installation into the module.

### 3.11.2 Coil Form

The coil form material is defined in MOTOROLA INC. drawing 74-P16553A. The materials used for the coil forms are variants of the following materials:

Phenolic  
Carbonyl  
Synthetic Oxide

The coil forms are coated with Paryene C or Polyurethane Spray depending upon the size of the coil. There are no tin materials or tin finishes used in the coil forms.

### 3.11.3 Coil Form, Two Hole Bead

The Coil form with two hole bead is made of Ferrite. The Ferrite is not coated. There are no tin materials or tin finishes used in the coil forms.

### 3.12 MOTOROLA INC. IDF Transformers/Inductors

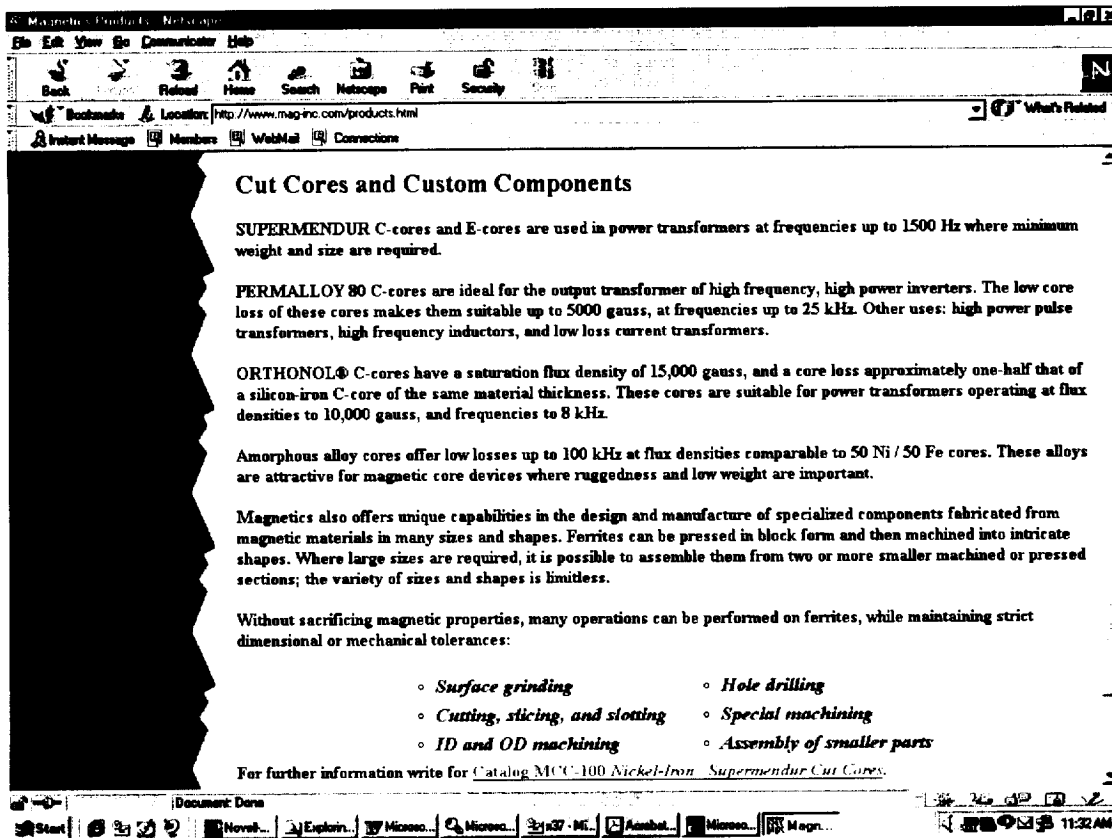
IDF Transformer/Inductor drawings do not prohibit the use of tin plating. The Transformer/Inductor drawings refer to MIL-T-27. MIL-T-27 does not contain a statement prohibiting the use of tin plating. The MOTOROLA INC. Purchase Order note that prohibits the use of pure tin was not applied to these parts since they are built at MOTOROLA INC.. The following table shows each of the IDF Transformers/Inductors and the materials used in their construction.

PTI CD	NOMENCLATURE	PART NUMBER	MAGNET WIRE QPL(J-W-1177)	TOROID CORE	TEFLON LEAD WIRE QPL
24	TRANSFORMER	TF7080S	30- P34069D421	55117-A2 MAGNETICS	
24	TRANSFORMER	TF7082S	30- P34069D421	55045-A2 MAGNETICS	
24	INDUCTOR	TF7088S	30- P34069D426	55035-A2 MAGNETICS	M22759/11-26-9
24	TRANSFORMER	TF7089S	30- P34069D433	768XT188-3E2A Phillips	M22759/11-24-9 M22759/11-26-9
24	TRANSFORMER	TF7090S	30- P34069D421	YJ-40705-TC TOROID CORE MAGNETICS	
24	TRANSFORMER	TF8027S	30- P34069D426 30- P34069D428	500XT400-3C85 TOROID CORE PHILIPS	M22759/11-26-9 M22759/11-20-9
24	TRANSFORMER	TF8028S	30- P34069D434	55035-A2 TOROID CORE MAGNETICS	M22759/11-28-9
24	TRANSFORMER	TF8029S	30- P34069D423	55206-A2 TOROID CORE MAGNETICS	M22759/11-22-9

PTI CD	NOMENCLATURE	PART NUMBER	MAGNET WIRE QPL(J-W-1177)	TOROID CORE	TEFLON LEAD WIRE QPL
24	TRANSFORMER	TF8031S	30- P34069D423	55025-A2 TOROID CORE MAGNETICS	
24	TRANSFORMER	TF8038S	30- P34069D428	502XT300-3F3 TOROID CORE PHILIPS	M22759/11-26-9 M22759/11-28-9
24	TRANSFORMER	TF8039S	30- P34069D436	55035-A2 TOROID CORE MAGNETICS	M22759/11-28-9
24	TRANSFORMER	TF8040S	30- P34069D426	55025-A2 TOROID CORE MAGNETICS	M22759/11-26-9
24	TRANSFORMER	TF8041S	30- P34069D426	55035-A2 TOROID CORE MAGNETICS	M22759/11-26-9

### 3.12.1 Magnetic Cores

The materials used in the Magnetic cores are shown in the following:



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Bookmarks Location: <http://www.mag-inc.com/products/hwt/Bobbin>

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## Tape Wound Cores

Tape Wound Cores are made from high permeability alloys of nickel-iron, grain oriented silicon-iron, and cobalt-iron. The alloys are known as Orthonal® Alloy 48, Square Permalloy 80, Round Permalloy, Supermalloy, Magnesi® Supermendur, and Amorphous alloys. Cores are available in all IEEE standard sizes and over 1,400 special sizes.

For a wide range of frequency applications, materials are produced in thicknesses from 1/2 mil through 14 mils. All core sizes can be provided in non-metallic (phenolic or plastic), aluminum, or GVB (Guaranteed Voltage Breakdown) coated aluminum boxes. Magnesi® material, being less sensitive to external stresses, is also available unboxed or epoxy encapsulated. Commonly used sizes are in stock for immediate shipment.

For further information write for [Catalog TWC 500](#).

Typical Applications: Magnetic Amplifiers, Converters, Inverters, Reactors, Regulators, Static Magnetic Devices.

[Back to Top of Page](#)

## Bobbin Cores

Miniature Tape Wound Bobbin Cores are manufactured from Permalloy 80, Orthonal, and Amorphous alloy 2714A ultra-thin tape (0.000125" to 0.001" thick). They are available in widths from 0.023" to 0.250" (wider on special request). Wound on non-magnetic stainless steel bobbins, core diameters are available down to 0.050", with flux capacities as low as several maxwells.

MAGNETICS sophisticated pulse test equipment reproduces most test programs and can measure accurately in the millivolt-microsecond region. Standard sizes are available from stock.

For further information write for [Catalog RCC 1.1](#).

Typical Applications: Magnetometers, Flux Gates, High Frequency Counters, Timers, Oscillators, Inverters, Magnetic

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Technical Information

Home

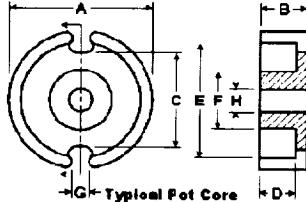


**MAGNETICS**®

Division of Spang and Company

## Ferrite Cores

High purity manganese-zinc ferrite pot cores exhibit low loss characteristics and exceptionally low disaccommodation. They are available with linear temperature characteristics (-30°C to +70°C) in permeabilities of 750 and 2000, or flat temperature characteristics (+20° to +70°C) in a 2300 permeability material. For transformer applications, the inductance of ungapped pot cores in the above materials are guaranteed to  $\pm 25\%$ . For filters, cores can be gapped to standard inductance factors guaranteed to  $\pm 3\%$ . Twenty-three physical sizes (3 x 2 mm to 45 x 29 mm) are stocked; each size offers a variety of standard inductance values.



→ G ← Typical Pot Core → D →

Toroids, E-cores, U-I cores, pot cores, and other shapes are also available for high frequency inductor and power transformers. For these applications, four low loss power materials with permeabilities of 1500, 2300, 2500, and 3000 are available.

Many of these same shapes are also available in high permeability materials of 5,000 $\mu$ , 10,000 $\mu$ , and 15,000 $\mu$  for EMI/RFI filters and broadband transformers.

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## 3.12.2 Phillips Cores

The Phillips Cores are ferrite with a epoxy coating as shown in the following inserts from their catalog.

## Ferrite ring cores (toroids)

TX13/7.1/4.8  
(768XT188)

## RING CORES (TOROIDS)

## Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(VA)$	core factor (C1)	2.43	$\text{mm}^{-1}$
$V_e$	effective volume	358	$\text{mm}^3$
$l_e$	effective length	29.5	mm
$A_e$	effective area	12.1	$\text{mm}^2$
m	mass of core	~1.8	g

## Coating

The cores are coated with epoxy.

Non-coated cores are available on request.

## Isolation voltage

DC Isolation voltage: 1000 V.

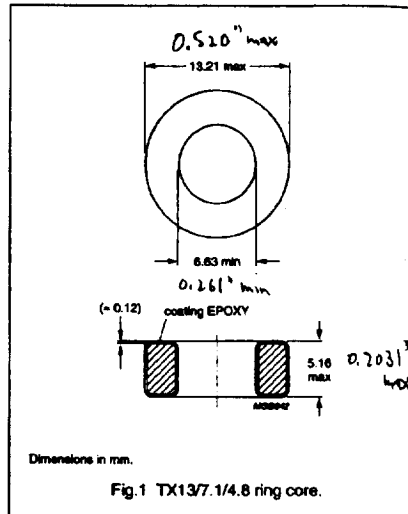


Fig.1 TX13/7.1/4.8 ring core.

## Ring core data

GRADE	$A_L$ (nH)	$\mu$	COLOUR CODE	TYPE NUMBER
3D3	415 $\pm 20\%$	~750	-	TX13/7.1/4.8-3D3
3F3	990 $\pm 20\%$	~1800	blue	TX13/7.1/4.8-3F3
3C85	1100 $\pm 20\%$	~2000	red	TX13/7.1/4.8-3C85
3C81	1475 $\pm 20\%$	~2700	light blue	TX13/7.1/4.8-3C81
3E27	2750 $\pm 20\%$	~5000	green	TX13/7.1/4.8-3E27
3E25	2750 $\pm 20\%$	~5000	orange	TX13/7.1/4.8-3E25
3E6	5400 $\pm 30\%$	~10400	purple	TX13/7.1/4.8-3E6

## Properties of cores under power conditions

GRADE	B (mT) at	CORE LOSS (W) at			
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; B = 200 mT; T = 100 °C	f = 100 kHz; B = 100 mT; T = 100 °C	f = 400 kHz; B = 50 mT; T = 100 °C	
3C81	$\geq 320$	$\leq 0.08$	-	-	
3C85	$\geq 320$	$\leq 0.06$	$\leq 0.07$	-	
3F3	$\geq 320$	-	$\leq 0.04$	$\leq 0.07$	

### 3.12.3 Wire, Elec-Magnet

The WIRE, ELEC-MAGNET is procured in accordance with MOTOROLA INC. drawing number 30-P34069D,

MAGNET WIRE, SINGLE CONDUCTOR AND BIFILAR, ROUND, MATERIAL REQUIREMENTS FOR. MOTOROLA INC. drawing number 30-P34069D defines the material properties of the wire in the following paragraph, 3.1.

#### "3.1 MATERIAL PROPERTIES

THE MATERIAL PROPERTIES SHALL BE IN ACCORDANCE WITH J-W-1177/9, /10, /39, /40, /42 EXCEPT THAT THE MATERIAL SHALL BE THE COLORS SHOWN IN TABLES I AND II."

J-W-1177 requires the following conductor core materials:

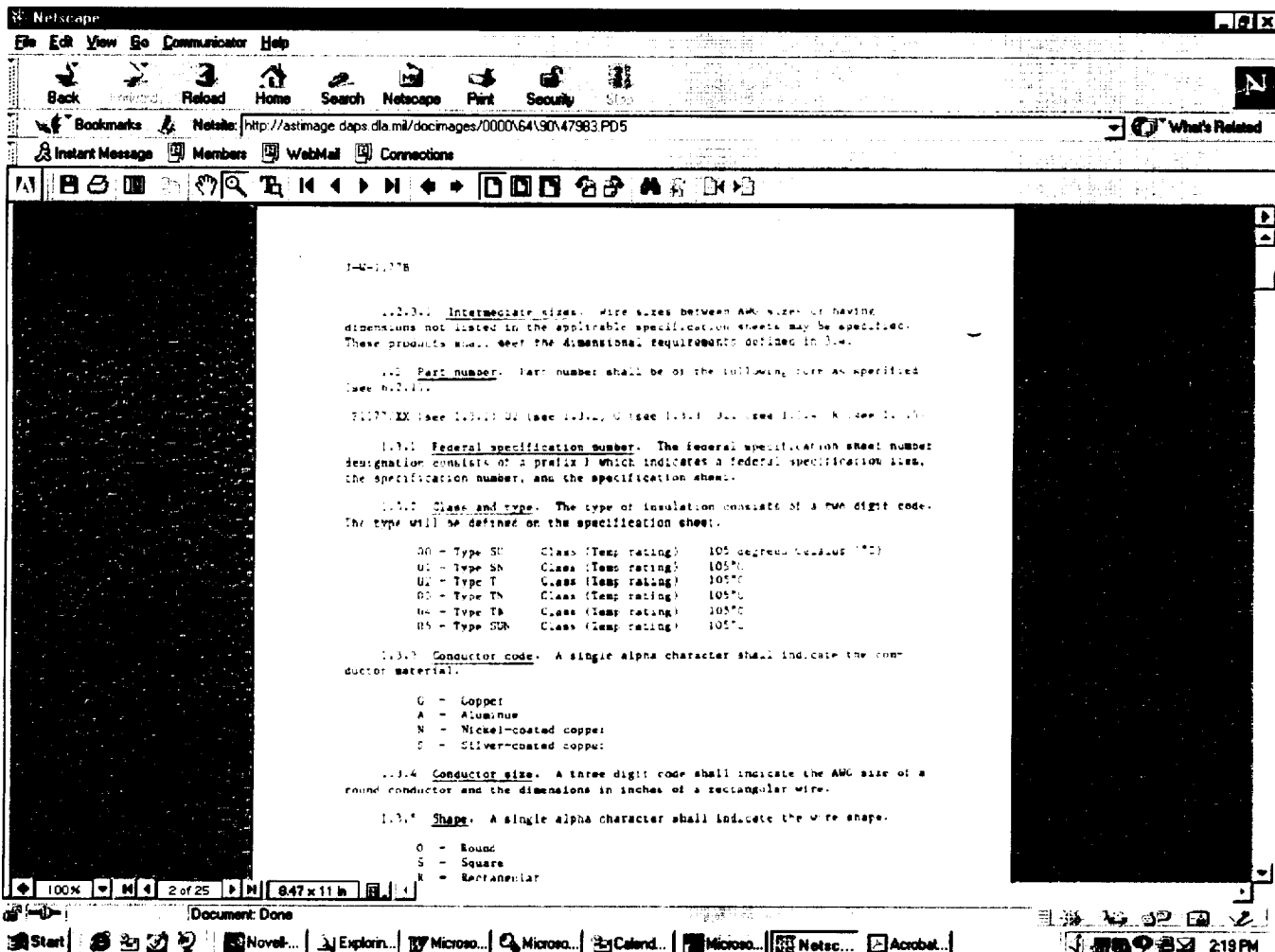
"1.3.3 Conductor code. A single alpha character shall indicate the conductor material.

c - Copper

A - Aluminum

N - Nickel-coated copper

S - Silver-coated copper"





The elec-magnet wire is coated in accordance with the following paragraph from J-W-1177:

*"1.3.2 Class and type. The type of insulation consists of a two digit codes. The type will be defined on the specification sheet.*

*00 - Type SU Class (Texnprating) 105 degrees Celsius (°C) 01 - Type SN Class (Temp rating) los"c*

*02 - Type T Class (Temp rating) los"c*

*03 - Type TN Class (Temp rating) 105°C*

*04 - Type TB Class (Temp rating) los"c*

*05 - Type SUN Class (Temp rating) los"c"*

The last step in the build sheet for the inductors/transformers solder coats the exposed electrical connection leads with SN 10 (see following insert from the build sheet).

**OPER STD.MTD WORKMANSHIP STANDARD PER 12-P32150D**

**110**

**28**

**FORM LEADS, CUT, TIN**

**LEAD BREAKOUT PER FIG:**

**SOLDER: SN 10 SN-63**

**OUTLINE DRAWING**

**METHOD:**

**NOTES: R FLUX, #5 TAPE BELLYBAND**

### 3.12.4 MIL-W-22759/11 WIRE

The Mil-W-22759/11 wire used in the IDF transformers is a silver coated copper conductor wire as shown in the following insert from MIL-W-22759/11.

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MIL-W-22759/11

31 April 1976  
See also "Supersession Data" on Page 3

**MILITARY SPECIFICATION SHEET**

**WIRE, ELECTRIC, PLAIN/POLYMER-INSULATED, EXTENDED TYPE, SILVER-COATED COPPER CONDUCTOR, 600-VOLT**

This specification is approved for use by all Departments and Agencies of the Department of Defense.

The complete requirements for procuring the wire described herein shall consist of this document and the issues in effect of Specification MIL-W-22759.

"General Purpose" Diameter  
Silver Coated Stranded  
Copper Conductor

Insulation-TYPE (Extruded)

TPS-Polytetrafluoroethylene

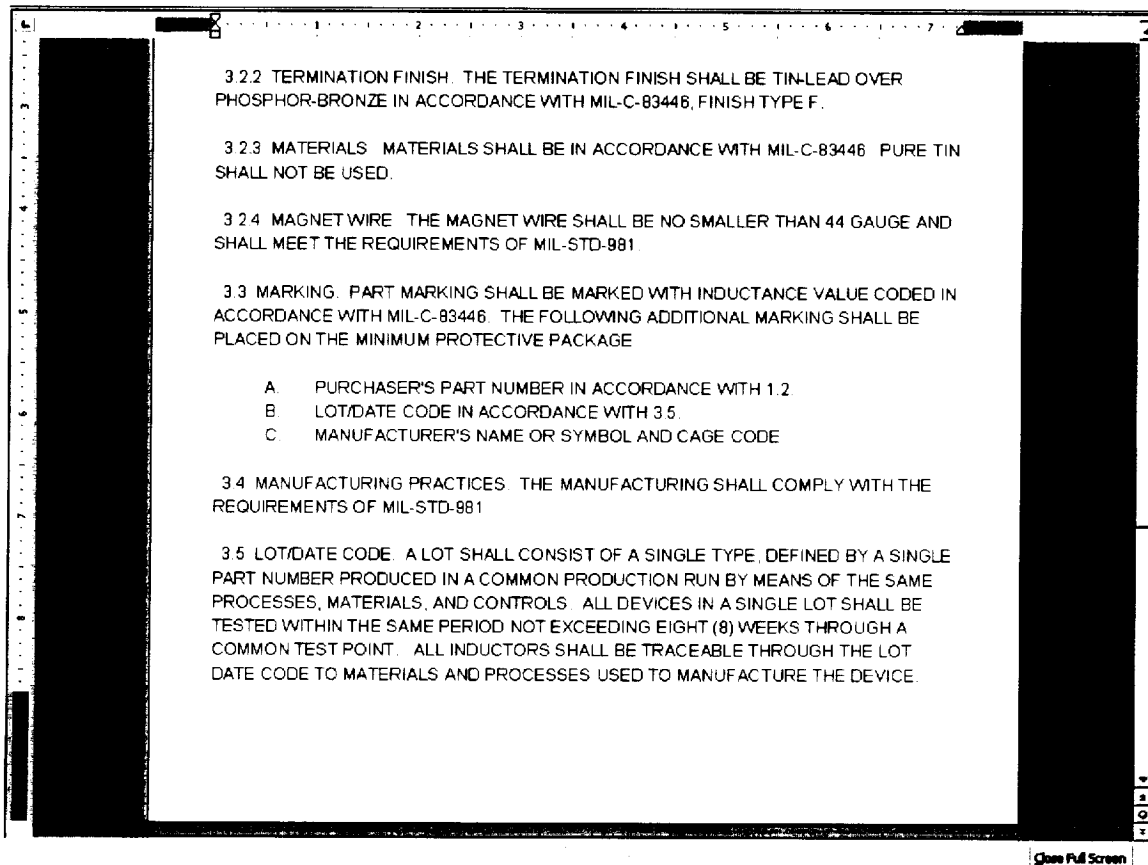
**TABLE 1. CONSTRUCTION DETAILS**

Part No. /	Wire size	Stranding (Number of strands & AWG size of strands)	Diameter of stranded conductor (inches)		Finished wire		
			(min)	(max)	Resistance at 20°C (68°F) (ohms/1000 ft) (max)	Diameter (inches)	Weight (lbs/1000 ft) (max)
MIL-W-22759/11-10-0	28	7 x 36	.014	.015	63.8	.033 ± .002	1.36
MIL-W-22759/11-14-0	24	19 x 36	.018	.020	36.4	.036 ± .002	1.90
MIL-W-22759/11-16-0	22	19 x 36	.023	.025	24.3	.043 ± .002	2.59
MIL-W-22759/11-20-0	20	19 x 36	.028	.032	19.1	.049 ± .002	3.22
MIL-W-22759/11-22-0	18	19 x 36	.037	.040	9.19	.058 ± .002	5.43
MIL-W-22759/11-24-0	16	19 x 36	.046	.050	5.79	.068 ± .002	8.14
MIL-W-22759/11-26-0	14	19 x 36	.057	.061	4.52	.075 ± .002	10.0
MIL-W-22759/11-28-0	12	19 x 36	.065	.072	2.88	.090 ± .002	15.1
MIL-W-22759/11-30-0	10	19 x 36	.082	.090	1.81	.111 ± .002	24.1
			.108	.112	1.19	.140 ± .002	37.8

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### 3.13 Inductors, 24-P40313E (screened M83446/11 inductors)

The MOTOROLA INC. drawing, 24-P40313E, does not prohibit the use of a pure tin finish, but it does specify the finish to be used on the inductors.



Mil-I-83346, the reference specification in the MOTOROLA INC. drawing (24-P40313E), allows the use of a tin plated finish.

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on subsequent pages has not been changed, but will be changed the next time this document is revised.

MIL-I-83446A  
4 May 1978

# PERFORMANCE SPECIFICATION

## COILS, CHIP, FIXED OR VARIABLE

### GENERAL SPECIFICATION FOR

This specification is approved for use by all Departments and Agencies of the Department of Defense.

#### 1. SCOPE

1.1 **Scope.** This specification covers the general requirements for fixed or variable, chip coil primarily intended for incorporation into hybrid microelectronic circuits. Procurement of chip coil of a specific design will require additional data in the form of specification sheets, giving detailed electrical and mechanical requirements, tolerances, and applicable additions and exceptions to the general requirements and tests specified herein (see 3.1 and 6.1).

1.2 **Classification.**

1.2.1 **Part number.** The part number shall be in the following form, and as specified (see 3.1 and 6.2):

M	83446	03	04	B
---	-------	----	----	---

Prefix meaning MIL specification item \_\_\_\_\_

General specification number \_\_\_\_\_

Detail specification sheet number (3.1) \_\_\_\_\_

Sequentially assigned dash numbers (3.1) \_\_\_\_\_

Termination finish (1.2.1.1) \_\_\_\_\_

1.2.1.1 **Termination finish.** The termination finish is identified by a single letter as shown in table 1.

TABLE 1. Termination finish

Code	Final finish	Method of assembly
A	Gold over nickel	Weldable
B	Tin-lead over nickel	Solderable
C	Tin plated	Solderable
D	Platinum-gold	Solderable/weldable
E	Palladium-silver	Solderable/weldable

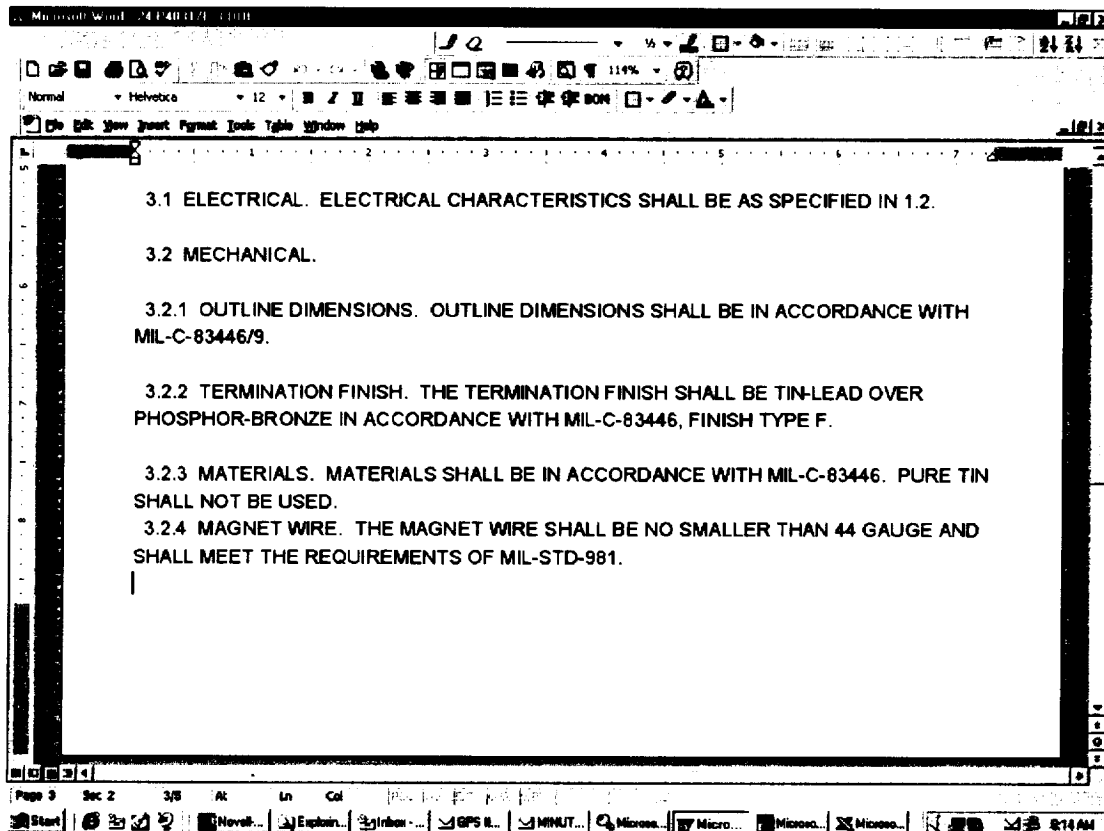
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## 3.14 24-P40317E Inductors (screened M83446/9 inductors)

The MOTOROLA INC. drawing, 24-P40317E, has the following requirements for termination finish and materials:



The termination finish is identified and pure tin is not allowed.

### 3.15 Transformer, 24-P48640E001 (Screened M21038/27-27)

The MOTOROLA INC. drawing 24-P48640E001 does not specify the lead finish nor does it prohibit the use of a pure tin finish. MIL-PRF-21038 does not specify the lead finish nor does it prohibit the use of a pure tin finish

### 3.16 SMA (Part Number 22MCX5002/111SSG, SSSD)

The finishes for the SMA connectors, MCX series are:

Center contact finish; gold

Outer contact finish; gold

Housing and body: gold

**Standard Platings for HUBER+SUHNER Connector Series:**

Series	Plating	Plating	Plating	Plating	Plating
MMCX	Gold	.. /111	Gold	Gold	Gold
MCX 50	Gold	.. /111	Gold	Gold	Gold
	SUCOPLATE®	.. /133	Gold	SUCOPLATE®	SUCOPLATE®
MCX 75	Gold	.. /133	Gold	Gold	SUCOPLATE®
SMB/SMC/SMS	Gold	.. /111	Gold	Gold	Gold
	SUCOPLATE®	.. /133	Gold	SUCOPLATE®	SUCOPLATE®
SMA	Gold	.. /111	Gold	Gold	Gold
	Stainless steel	.. /199	Gold	Stainless steel	Stainless steel
	SUCOPLATE®	.. /133	Gold	SUCOPLATE®	SUCOPLATE®
PC 3.5	Stainless steel	.. /199	Gold	Stainless steel	Stainless steel
K	Gold	.. /119	Gold	Gold	Stainless steel
GLA	Nickel	.. /122	Gold	Nickel	Nickel
BNC/TNC	SUCOPLATE®	.. /133	Gold	SUCOPLATE®	SUCOPLATE®
BNO/BNT	SUCOPLATE®	.. /133	Gold	SUCOPLATE®	SUCOPLATE®
SHV/MHV	SUCOPLATE®	.. /133	Gold	SUCOPLATE®	SUCOPLATE®
N	SUCOPLATE®	.. /133	Gold	SUCOPLATE®	SUCOPLATE®
	Silver	.. /003	Silver	Silver	SUCOPLATE®
1.0/2.3	Gold	.. /111	Gold	Gold	Gold
	Gold	.. /113	Gold	Gold	SUCOPLATE®
4.1/9.5	Silver	.. /003	Silver	Silver	SUCOPLATE®
7/16	Silver	.. /003	Silver	Silver	SUCOPLATE®

## 3.17 Connector SMT PLUG, 2367-0000-54

The Connector Plug is procured to M/A-Com part number 2367-0000-54. The M/A-Com specification identifies the Connector plug finish as Gold plate over nickel plate, but does not prohibit the use of a pure tin finish.

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**SSMT™ Specifications**

Requirement	Detail
<b>General</b>	
Materials	
SMT Plug	Housing: Polyphenylene Sulfide Contacts: Copper Alloy
SSMT™ Cable Jack	Outer Contact: Beryllium Copper Inner Contact: Beryllium Copper Dielectric: Polypropylene, GF
Finish	Plug and cable jack: Contacts: Gold plate over nickel plate
<b>Electrical</b>	
Frequency	dc - 6 GHz
Nominal impedance	50 Ohms
Voltage Rating	250 Volts (VRMS Maximum) @ Sea Level
VSWR (Mated Pair)	1.20:1 Maximum @ 2 GHz 1.40:1 Maximum @ 6 GHz
Insulation Resistance	5000 Megohms Minimum
Dielectric Withstanding Voltage	500 Volts (VRMS Minimum) @ Sea Level
Contact Resistance (Connectors Only)	
Center Contact	15 milliohms Maximum
Outer Contact	10 milliohms Maximum
Insertion Loss (Connectors Only)	15dB Max @ 6 GHz
<b>Mechanical</b>	
Connector Durability	100 mating cycles
Tape/Reel Packaging (Plug)	12mm per EIA-481
Force to Engage	5.5 lbs Max (3.5 lbs typ)
Force to Disengage	12.0 lbs typ (4.0 lbs Max (2.0 lbs typ))
Force to Disengage by 30° (Frame Min) (200° Frame for initial mate)	

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Thursday, July 06, 2000 11:08 AM

### 3.18 Connector, RF, TRIAXIAL, 28-P38549Y001

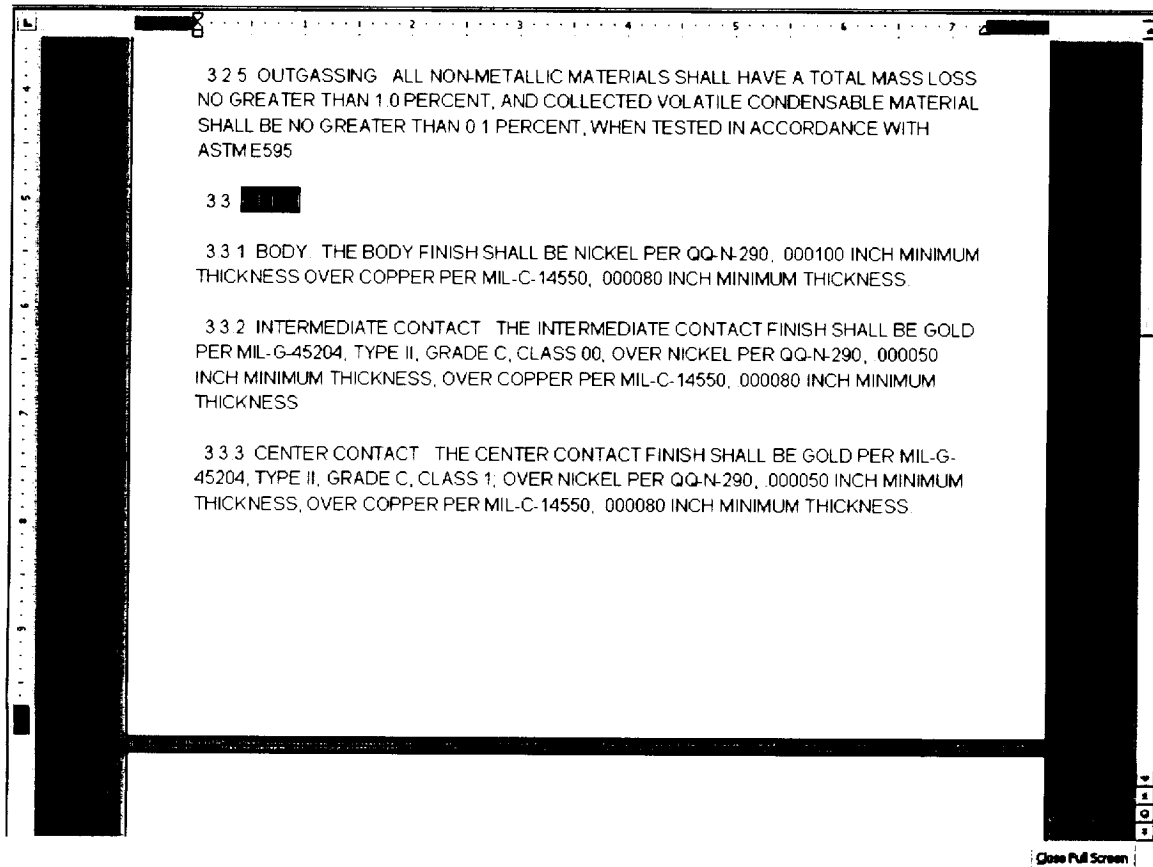
The MOTOROLA INC. drawing specifies the following finishes:

body finish; nickel over copper

Intermediate contact finish; gold over nickel

Center contact finish; gold over nickel over copper.

The MOTOROLA INC. drawing does not prohibit the use of a pure tin finish.



### 3.19 Connector Coaxial Subminiature SMA and Contact Pin, 28-P39895P001 / 28-P39895P002

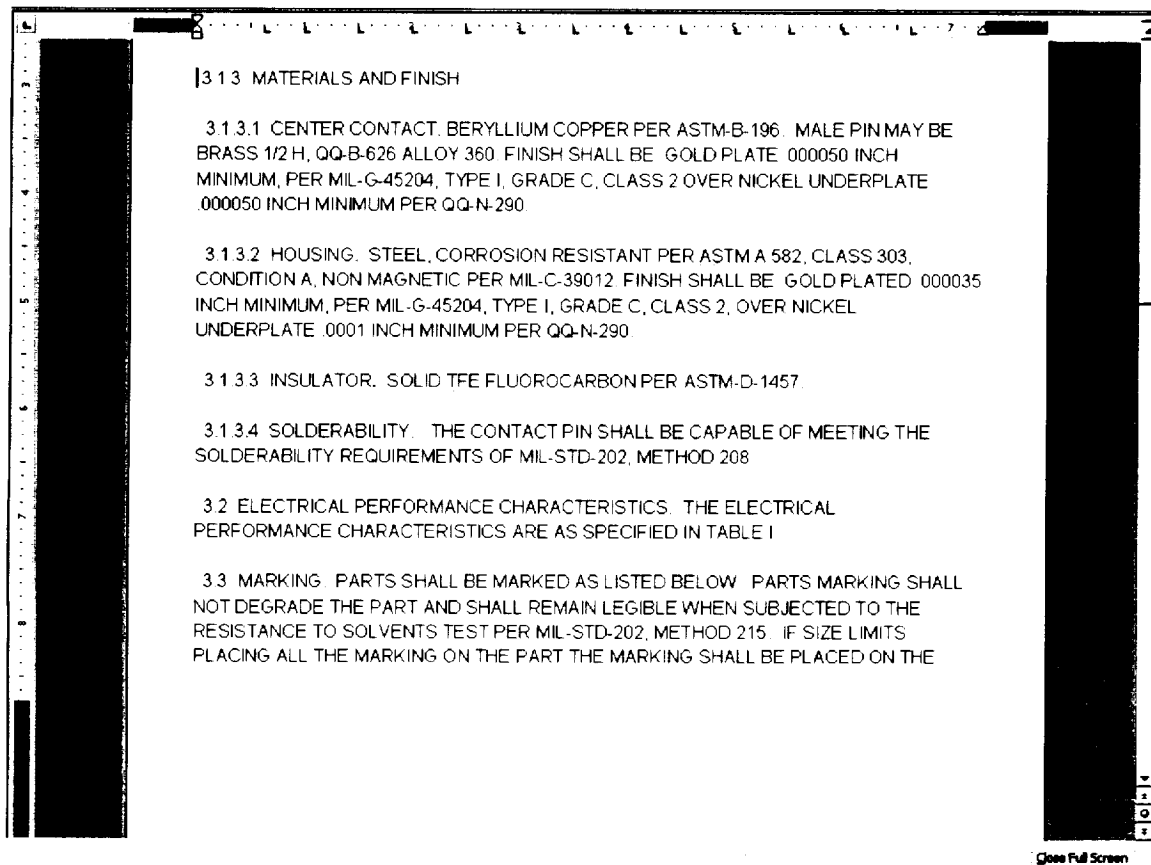
The MOTOROLA INC. drawing specifies the following finishes:

Center contact finish: gold over nickel

Housing finish: gold plated

Male pin finish: gold over nickel

The MOTOROLA INC. drawing does not prohibit the use of a pure tin finish.





### 3.20 Connector, Programming, 28-P40036E001

The programming connector is a subassembly that contains the following parts:

QTY	Mil-Spec	Part No.	Description	Part Value
1.0000		15-P40038E001	COVER, PROGRAMMING	CONNECTOR
1.0000		29-P40037E001	TERMINAL STRIP	
2.0000		MS51957-7	SCREW	.0860-56X.500
2.0000		NAS671C2	NUT	.086-56
0.0000		11-P34036D001	INK, BLK	BLACK
0.0000	QQ-S-571	SN63WRMAP3	SOLDER	
0.0000		11-P34009D002	ADHESIVE	2216 2% CAB-O-SIL
1.0000		12-P40005E	TEST PROCEDURE, TDRSS IV	
1.0000	MIL-C-83513/4	M83513/04-D05N	CONNECTOR	25 SOCKET

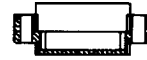
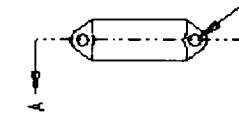
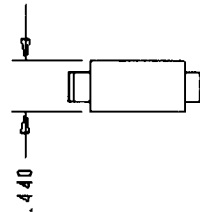
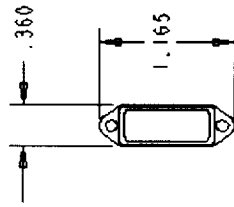
#### 3.20.1 Connector Cover, 15-P40038E001

The finish required by the following MOTOROLA INC. drawing number 15-P40038E is electroless nickel coating.



4. FINISH- ELECTROLESS NICKEL COATING,  
CLASS 4, GRADE B, .0005/ .0007 THICK,  
PER MIL -C-26074.
5. PART SHALL BE CLEAN AND FREE OF ALL  
BURRS AND SHARP EDGES.
6. SURFACE FINISH ON MACHINED SURFACES SHALL BE  
125 MICROINCHES OR SMOOTHER.
7. DIMENSIONAL LIMITS APPLY AFTER COATING (PLATING).
8. UNLESS OTHERWISE SPECIFIED, ALL FILLET  
RADIUS SHALL BE .010 MAX.
9. PACKAGE TO ENSURE PROTECTION FROM CONTAMINATION  
AND/OR DAMAGE RESULTING FROM HANDLING, STORAGE  
OR SHIPPING. IDENTIFICATION SHALL BE PER NOTE 10.
10. PART NUMBER 15-P40038E055, REVISION LEVEL, AND  
MANUFACTURER'S IDENTITY SHALL APPEAR ON OR IN  
THE MINIMUM PROTECTIVE PACKAGE PER MIL-STD-130
11. NUMERICAL CONTROL IGES PART FABRICATION FILES:  

15-P40038E001.IGS	13D IGES)
15-P40038E.1.IGS	12D IGES SHT 1)
15-P40038E001.PRT	(PROVE PART FILE)



CT 1515



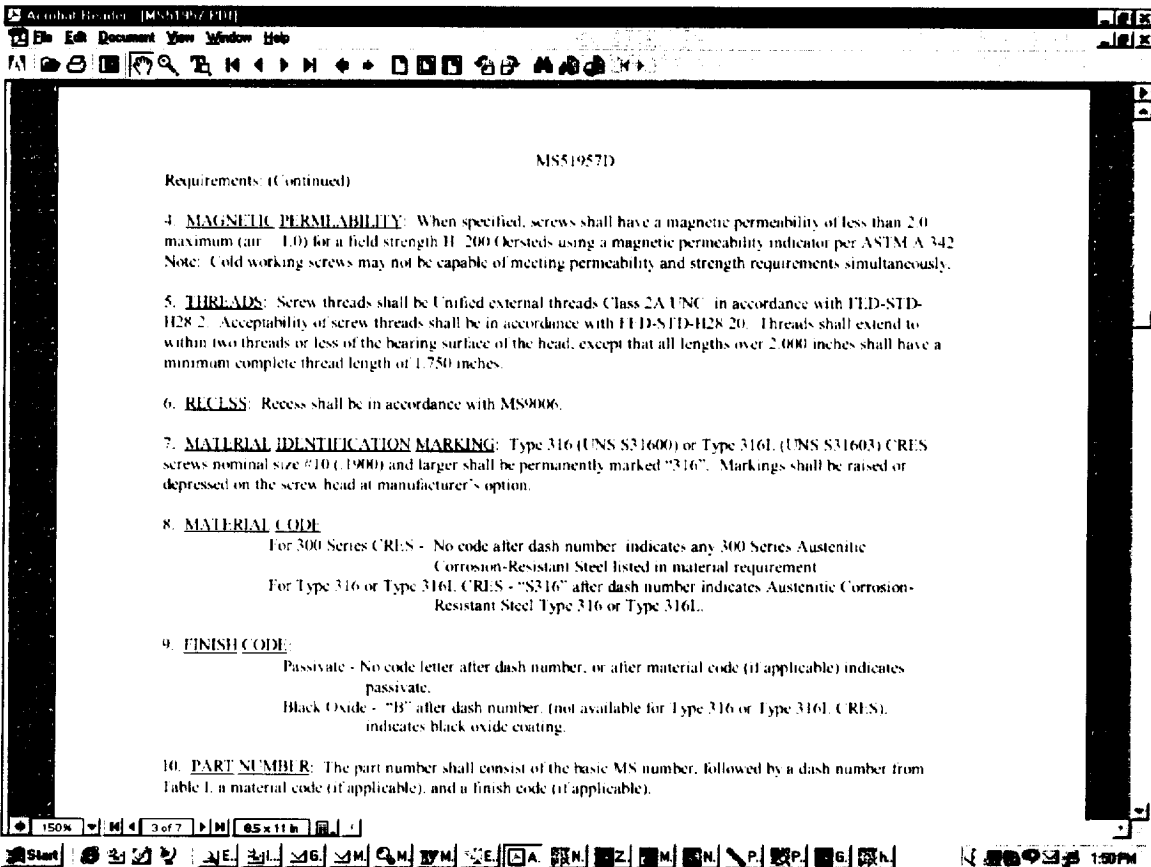


The finish specified by the following drawing, 29-P40037E, for the terminal strip is tin-lead plating.



### 3.20.3 Screw, MS51957-7

The following insert from MS51957 specifies the finish on the corrosion resistance steel screw as Passivated (E.G., no code letter after the dash number).



## 3.20.4 Nut, NAS671C2

The finish specified by NAS671C2 is cadmium plate, or Passivated

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30° ±5° (TYP)

DASH NO.	THREAD T	A		B	REF	ØC	H	
		MAX	MIN				MAX	MIN
-0	.0000-30 UNJT-3B	.125	.121	.140	.112	.050	.043	
-1	.0750-30 UNJC-3B	.125	.121	.140	.112	.050	.043	
-2	.0860-30 UNJC-3B	.150	.146	.160	.140	.065	.057	
-3	.0990-30 UNJC-3B	.150	.146	.160	.140	.065	.057	
-4	.1120-30 UNJC-3B	.180	.176	.217	.167	.060	.057	
-5	.1380-32 UNJC-3B	.250	.241	.289	.210	.090	.087	
-6	.1560-32 UNJC-3B	.315	.302	.361	.282	.116	.102	
-10	.1800-32 UNJC-3B	.360	.352	.390	.310	.130	.117	

**MATERIAL:** Castor steel, 98% min. The surface of phosphorus treated steel shall not be greater than 2.0% by weight. Optional materials: 3014 (UNS 30240) per ASTM A192 and 304 (UNS 30400) per ASTM A304.

**FINISH:** Steel, Carbon, Cadmium Plate per QQ-P-416, Type II, Class 2.  
Steel, Carbon, Passivate per QQ-P-35.  
Brass, Cadmium Plate per QQ-P-416, Type II, Class 2.

**CODE:** Letter "B" between basic number and dash number indicates Brass Cadmium Plated.  
Letter "C" between basic number and dash number indicates Castor.

**EXAMPLE OF PART NUMBER:** NAS671-3 Steel Cad Plated Nut  
NAS671B3 Brass Cad Plated Nut  
NAS671C3 Castor Nut

**THREADS:** Threads shall be in accordance with NTL-5-8879.

**NOTES:**

1. Nuts shall be free of all burrs and slivers which might become dislodged under usage.
2. Dimensions in inches unless otherwise specified.
3. Class 3 Cadmium Plating acceptable until 15 March 1977.
4. Class 3B Threads per NTL-5-7342 acceptable until 15 March 1977.
5. This standard takes precedence over documents referenced herein.

CUSTOMER: NATIONAL AEROSPACE STANDARDS COMMITTEE

PRELIMINARY SPECIFICATION: 77-N-836

WUT, PLAIN, HEXAGON - SMALL PATTERN, NONSTRUCTURAL

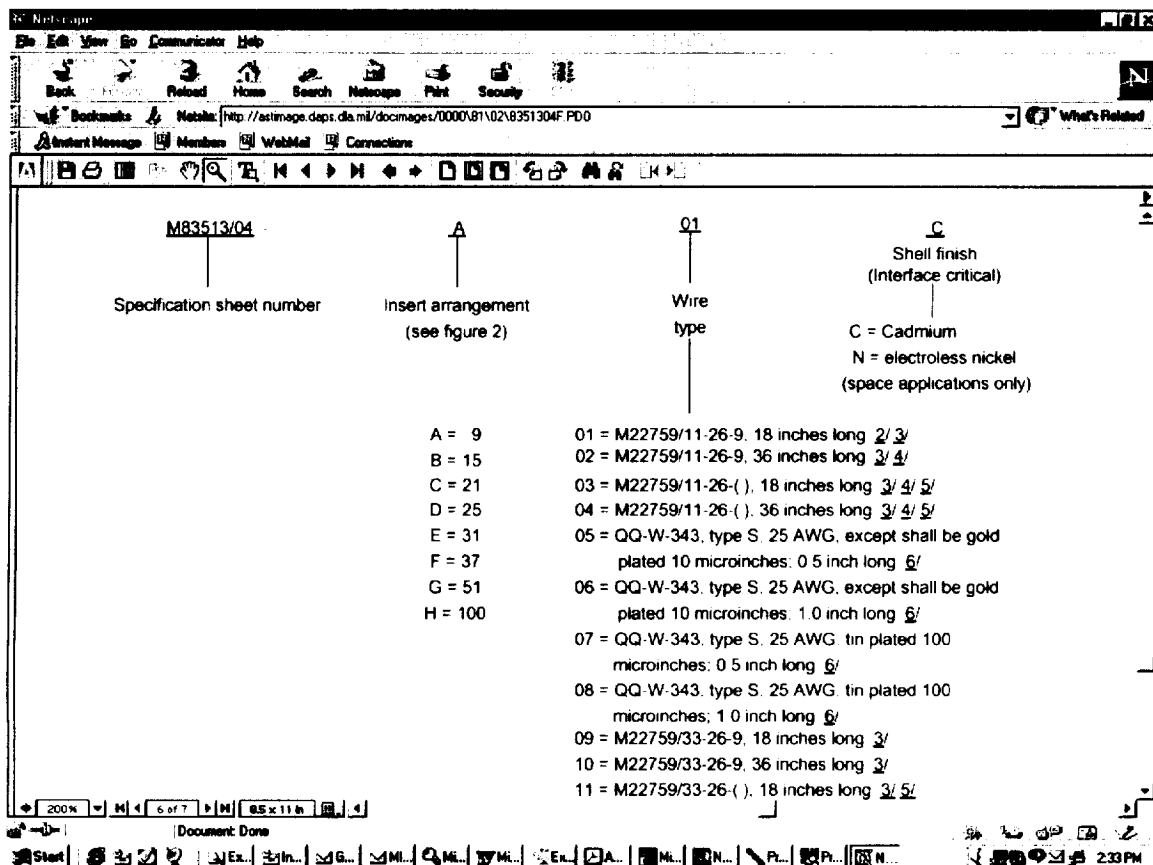
STANDARD PART: NAS 871

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## 3.20.5 Connector, M83513/04-D05N

The connector shell finish specified in the following specification is electroless nickel (E.G., the last letter of the part number specifies the finish). The wire type is 05, gold plated; 0.5 inches long. The specification does not prohibit the use of a pure tin finish.



Contacts (pins) are gold plated in accordance with the following specification.

MIL-PRF-83513D

6.5.3 Pigtail wires. Based on past experience, to successfully meet the performance requirements of this specification, when pigtail wires have been required in the construction of the connectors, insulated wire in accordance with MIL-W-22759/11 (for non space) and MIL-W-22759/33 (for Space), has been used. When non insulated wire was required, the wire was in accordance with QQ-W-343.

6.5.4 Interfacial seals. Based on past experience, to successfully meet the performance requirements of this specification, materials used to fabricate interfacial seals have been made from fluorosilicone elastomer in accordance with ZZ-R-765 or MIL-R-25988, or a blend thereof.

6.5.5 Contact plating. Based on past experience, to successfully meet the performance requirements of this specification, contacts have been gold plated in accordance with MIL-G-45204 type II, grade C, class 1, over a suitable underplate. Minimum gold plating thickness of 50 microinches has been used, with silver underplating not being allowed.

6.5.6 Dissimilar metals. When dissimilar metal are employed in intimate contact with each other, protection against electrolytic corrosion has been provided. Previous techniques to successfully provide this protection followed guideline 16 of MIL-HDBK-454.

6.5.7 Fungus resistance. Based on past experience, to successfully meet the requirements of this specification, connector materials have been made of material which are fungus inert in accordance with guideline 4 of MIL-HDBK-454.

CONCLUDING MATERIAL

Custodians:  
 Army - CR  
 Navy - EC  
 Air Force - 85

Preparing activity:  
 DLA - CC

Review activities  
 Army - MI, AT, ME

(Project 5935-4011)

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## 3.21 Connector, M83513/03-X0XN

The connector shell finish specified in the following specification is electroless nickel (E.G., the last letter of the part number specifies the finish). The specification does not prohibit the use of a pure tin finish.

Part or Identifying Number (PIN): Consists of the letter M, the basic number of the specification sheet, a letter from the insert column and the shell finish.

<p><u>M83513/03</u></p> <p>Specification sheet number</p>	<p><u>A</u></p> <p>Insert arrangement (see figure 2)</p>	<p><u>01</u></p> <p>Wire type</p>	<p><u>C</u></p> <p>Shell finish (Interface critical)</p> <p>C = Cadmium N = electroless nickel (space applications only)</p>
---	--	-----------------------------------	--

<p>A = 9 B = 15 C = 21 D = 25 E = 31 F = 37 G = 51 H = 100</p>	<p>01 = M22759/11-26-9, 18 inches long <u>2/ 3/</u> 02 = M22759/11-26-9, 36 inches long <u>3/ 4/</u> 03 = M22759/11-26-( ), 18 inches long <u>3/ 4/ 5/</u> 04 = M22759/11-26-( ), 36 inches long <u>3/ 4/ 5/</u> 05 = QQ-W-343, type S, 25 AWG, except shall be gold plated 10 microinches: 0.5 inch long <u>6/</u> 06 = QQ-W-343, type S, 25 AWG, except shall be gold plated 10 microinches: 1.0 inch long <u>6/</u> 07 = QQ-W-343, type S, 25 AWG, tin plated 100 microinches: 0.5 inch long <u>6/</u> 08 = QQ-W-343, type S, 25 AWG, tin plated 100 microinches: 1.0 inch long <u>6/</u> 09 = M22759/33-26-9, 18 inches long <u>3/</u> 10 = M22759/33-26-9, 36 inches long <u>3/</u> 11 = M22759/33-26-( ), 18 inches long <u>3/ 5/</u> 12 = M22759/33-26-( ), 36 inches long <u>3/ 5/</u> 13 = M22759/11-26-9, 72 inches long <u>3/</u> 14 = M22759/11-26-( ), 72 inches long <u>3/ 5/</u></p>
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Contacts (pins) are gold plated in accordance with the following specification.

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MIL-PRF-83513D

6.5.3 Pigtail wires. Based on past experience, to successfully meet the performance requirements of this specification, when pigtail wires have been required in the construction of the connectors, insulated wire in accordance with MIL-W-22759/11 (for non space) and MIL-W-22759/33 (for Space), has been used. When non insulated wire was required, the wire was in accordance with QQ-W-343.

6.5.4 Interfacial seals. Based on past experience, to successfully meet the performance requirements of this specification materials used to fabricate interfacial seals have been made from fluorosilicone elastomer in accordance ZZ-R-765 or MIL-R-25988, or a blend thereof.

6.5.5 Contact plating. Based on past experience, to successfully meet the performance requirements of this specification, contacts have been gold plated in accordance with MIL-G-45204 type II, grade C, class 1, over a suitable underplate. Minimum gold plating thickness of 50 microinches has been used, with silver underplating not being allowed.

6.5.6 Dissimilar metals. When dissimilar metal are employed in intimate contact with each other, protection against electrolytic corrosion has been provided. Previous techniques to successfully provide this protection followed guideline 16 of MIL-HDBK-454.

6.5.7 Fungus resistance. Based on past experience, to successfully meet the requirements of this specification, connector materials have been made of material which are fungus inert in accordance with guideline 4 of MIL-HDBK-454.

CONCLUDING MATERIAL

Custodians:  
Army - CR  
Navy - EC  
Air Force - 85

Preparing activity:  
DLA - CC

Review activities  
Army - MI, AT, ME

(Project 5935-4011)

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### 3.22 Connector, M83513/04-X0XN

The connector shell finish specified in the following specification is electroless nickel (E.G., the last letter of the part number specifies the finish). The specification does not prohibit the use of a pure tin finish.

Mating plug. Shall conform to MIL-PRF-83513/1 or MIL-PRF-83513/3.

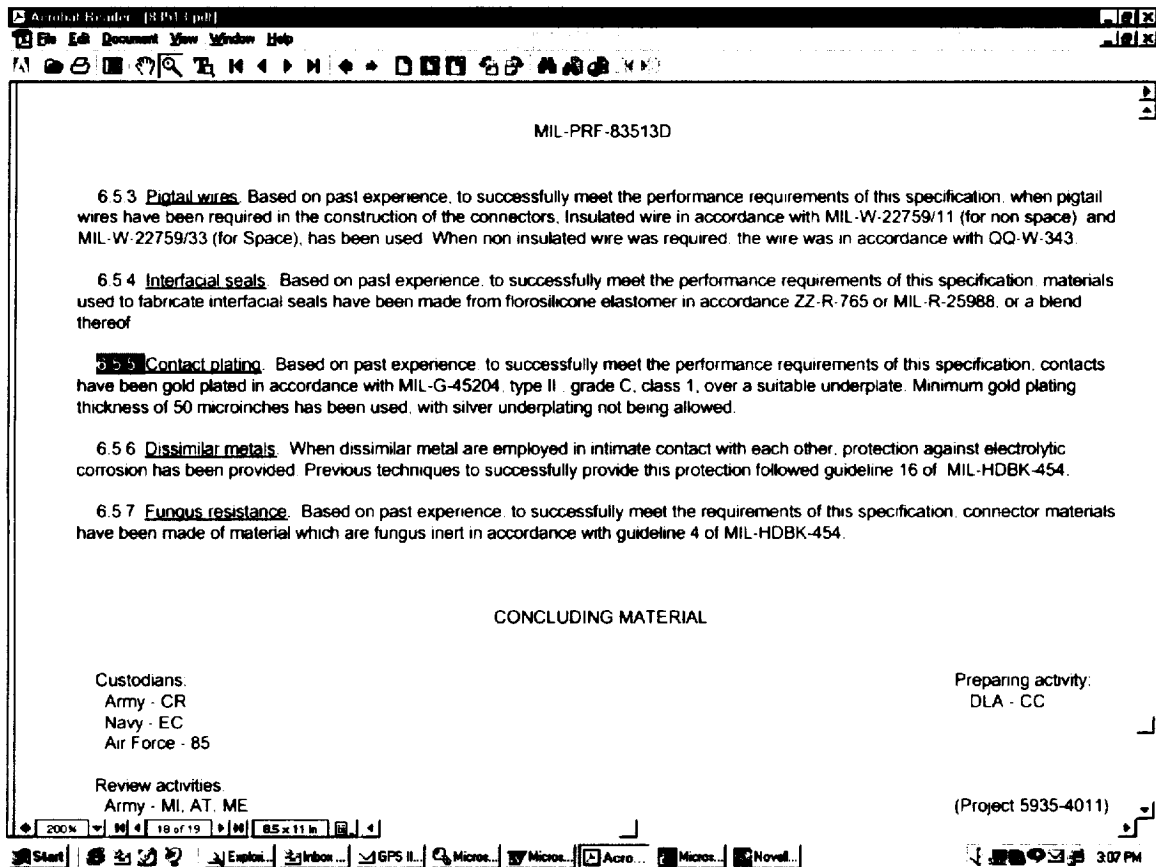
Part or Identifying Number (PIN): Consists of the letter M, the basic number of the specification sheet, a letter from the insert column and the shell finish

<u>M83513/04</u> Specification sheet number	<u>A</u> Insert arrangement (see figure 2)	<u>01</u> Wire type	<u>C</u> Shell finish (Interface critical) C = Cadmium N = electroless nickel (space applications only)
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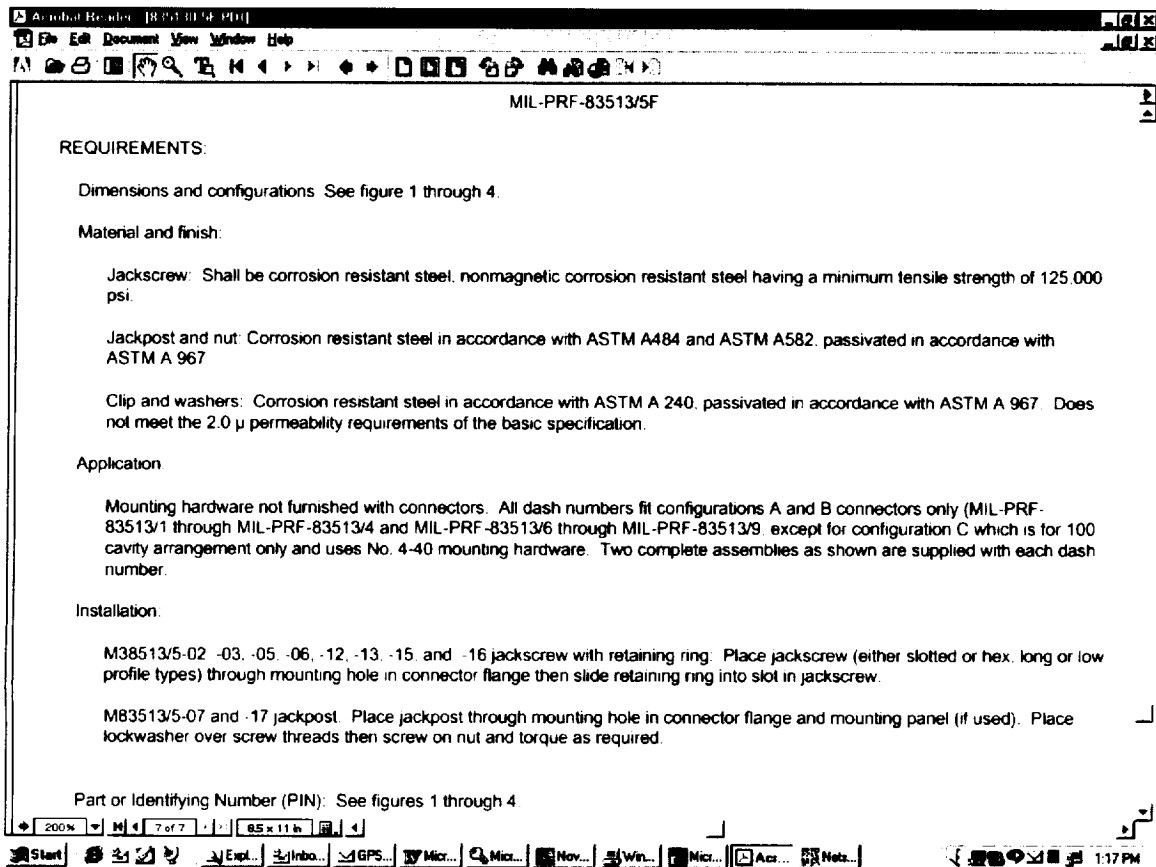
A = 9 B = 15 C = 21 D = 25 E = 31 F = 37 G = 51 H = 100	01 = M22759/11-26-9, 18 inches long $\frac{2}{3}$ / $\frac{3}{4}$ 02 = M22759/11-26-9, 36 inches long $\frac{3}{4}$ / $\frac{5}{8}$ 03 = M22759/11-26-(), 18 inches long $\frac{3}{4}$ / $\frac{5}{8}$ 04 = M22759/11-26-(), 36 inches long $\frac{3}{4}$ / $\frac{5}{8}$ 05 = QQ-W-343, type S, 25 AWG, except shall be gold plated 10 microinches; 0.5 inch long $\frac{6}{8}$ 06 = QQ-W-343, type S, 25 AWG, except shall be gold plated 10 microinches; 1.0 inch long $\frac{6}{8}$ 07 = QQ-W-343, type S, 25 AWG, tin plated 100 microinches; 0.5 inch long $\frac{6}{8}$ 08 = QQ-W-343, type S, 25 AWG, tin plated 100 microinches; 1.0 inch long $\frac{6}{8}$ 09 = M22759/33-26-9, 18 inches long $\frac{3}{4}$ / $\frac{5}{8}$ 10 = M22759/33-26-9, 36 inches long $\frac{3}{4}$ / $\frac{5}{8}$ 11 = M22759/33-26-(), 18 inches long $\frac{3}{4}$ / $\frac{5}{8}$ 12 = M22759/33-26-(), 36 inches long $\frac{3}{4}$ / $\frac{5}{8}$
--	--

Contacts (pins) are gold plated in accordance with the following specification.



### 3.23 JACK POST ASSY, M83513/5-02 AND 07

The jackscrew shell is corrosion resistant steel. The jackpost and nut are corrosion resistant steel in accordance with ASTM A484 and ASTM A582, passivated in accordance with ASTM A 967. The clip and washers are corrosion resistant steel in accordance with ASTM A 240; passivated in accordance with ASTM A 967.



## 3.24 Transistor, 2223-1.7HV

These transistors are procured from GHz Technology to their data sheet. The data sheet does not specify the material finish of the package or the leads.

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GHz TECHNOLOGY  
RF MICROWAVE SILICON POWER TRANSISTORS

## 2223-1.7

1.7 Watts - 24 Volts, Class C  
Microwave 2200 - 2300 MHz

### GENERAL DESCRIPTION

The 2223-1.7 is a COMMON BASE transistor capable of providing 1.7 Watts of Class C RF output power over the band 2200 - 2300 MHz. This transistor is designed for Microwave Broadband Class C amplifier applications. It includes input prematching and utilizes Gold metalization and diffused ballasting to provide high reliability and supreme ruggedness. The transistor uses a fully hermetic High Temperature Solder sealed package.

### ABSOLUTE MAXIMUM RATINGS

Maximum Power Dissipation @ 25°C 7 Watts

Maximum Voltage and Current

BVces	Collector to Emitter Voltage	45 Volts
BVebo	Emitter to Base Voltage	3.5 Volts
Ic	Collector Current	.25 Amps

Maximum Temperatures

Storage Temperature	65 to - 200°C
Operating Junction Temperature	- 200°C

### CASE OUTLINE

55LV, STYLE 1

### ELECTRICAL CHARACTERISTICS @ 25°C

SYMBOL	CHARACTERISTICS	TEST CONDITIONS	MIN	TYP	MAX	UNITS
P <sub>out</sub>	Power Output	f = 2.2 - 2.3 GHz	1.7			Watts

161K 1 of 3 0.5 x 11 in

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DPA report 11880-147 shows a gold plating on both the leads and the package.

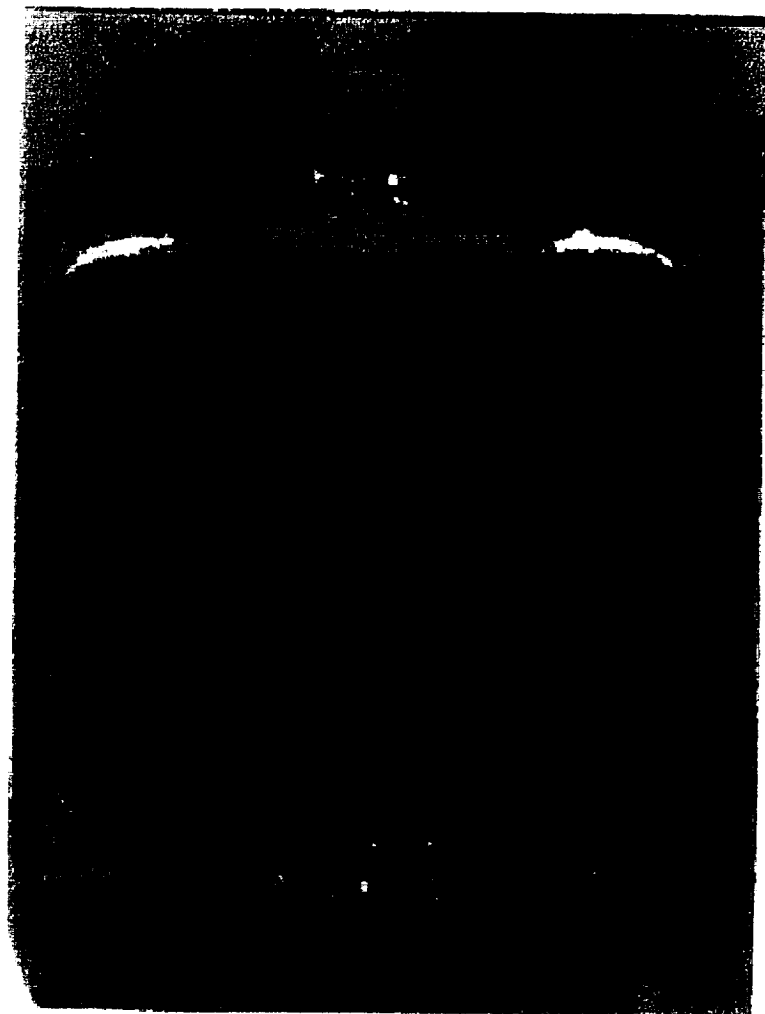


FIGURE NO.	8
SAMPLE NO.	1
MAG.	12x
SUBJECT	
OVERALL OF PART SHOWING MARKING	

MICROGRAPH

## 3.25 Transistor, 2223-9AHV

These transistors are procured from GHz Technology to their data sheet. The following data sheet does not specify the material finish of the package or the

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2223-9A

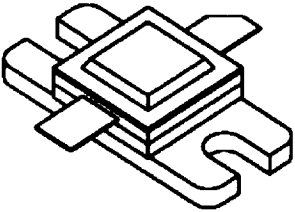
9 Watts - 24 Volts, Class C  
Microwave 2200 - 2300 MHz

**GHz TECHNOLOGY**  
RF MICROWAVE SILICON POWER TRANSISTORS

**GENERAL DESCRIPTION**

The 2223-9A is a COMMON BASE transistor capable of providing 9 Watts of Class C RF output power over the band 2200 - 2300 MHz. This transistor is designed for Microwave Broadband Class C amplifier applications. It includes input and output prematching and utilizes Gold metallization and diffused ballasting to provide high reliability and supreme ruggedness. The transistor uses a fully hermetic High Temperature Solder sealed package.

**CASE OUTLINE**  
55AW, STYLE 1



**ABSOLUTE MAXIMUM RATINGS**

Maximum Power Dissipation @ 25°C 20 Watts

**Maximum Voltage and Current**

BV <sub>ces</sub> Collector to Emitter Voltage	45 Volts
BV <sub>ebo</sub> Emitter to Base Voltage	3.5 Volts
I <sub>c</sub> Collector Current	1.5 Amps

**Maximum Temperatures**

Storage Temperature	-65 to +200°C
Operating Junction Temperature	+200°C

leads. DPA report 11880-150 shows a gold plate for both the leads and the package.



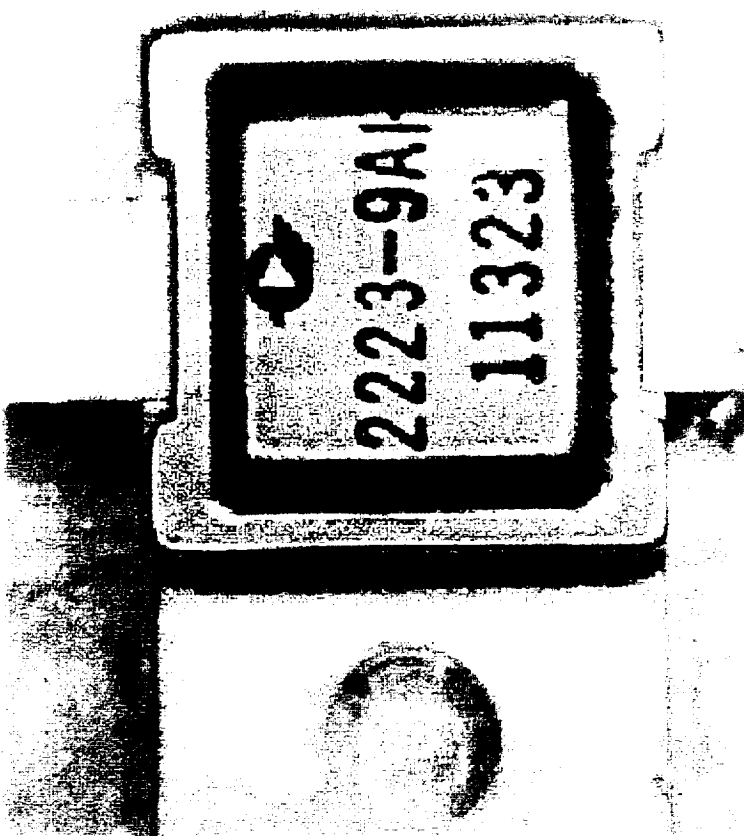


FIGURE NO. 14

SAMPLE NO: 39

MAG: 7 x

SUBJECT:

OVERALL OF PART SHOWING  
MARKING.

FIG. 3P42.FRM

### 3.26 Transistor, 48-P24290N001 (AT41470)

These transistors are procured to a Space Station Source Control Drawing (SCD), 48-P24290N. The lead finish and restrictions on the case material are defined in the following paragraphs of the SCD:

*"3.3.3 Lead Finish: The leads shall be gold plated over nickel in accordance with MIL-STD-1276."*

*"3.4.10 Case Material: Zinc cadmium or pure tin shall not be used as a finish material. "*

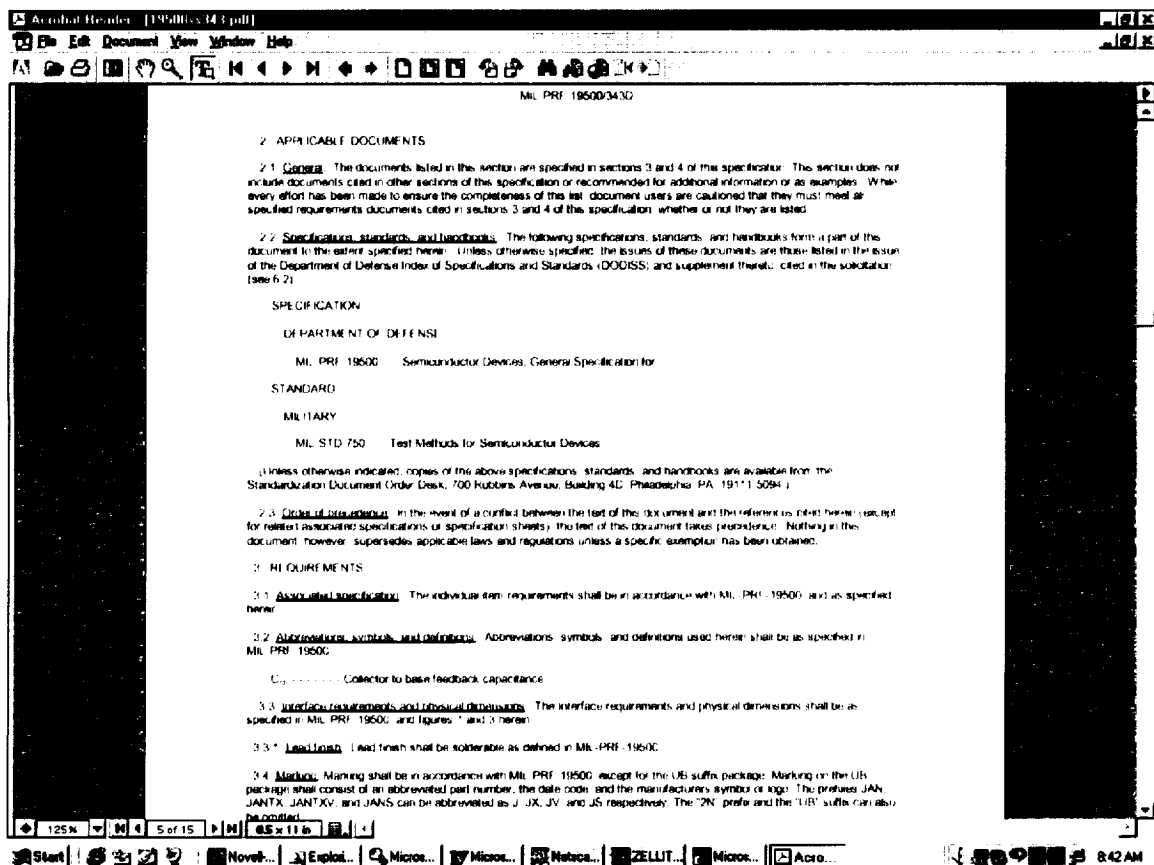
## 3.27 Transistor, 48-P40301E001 (2N2857AUB)

The MOTOROLA INC. drawing, 48-P40301E, does not specify the lead or package finish nor does it prohibit the use of pure tin. The MOTOROLA INC. drawing, 48-P40301E, refers to MIL-PRF-19500/343 in the following paragraph:

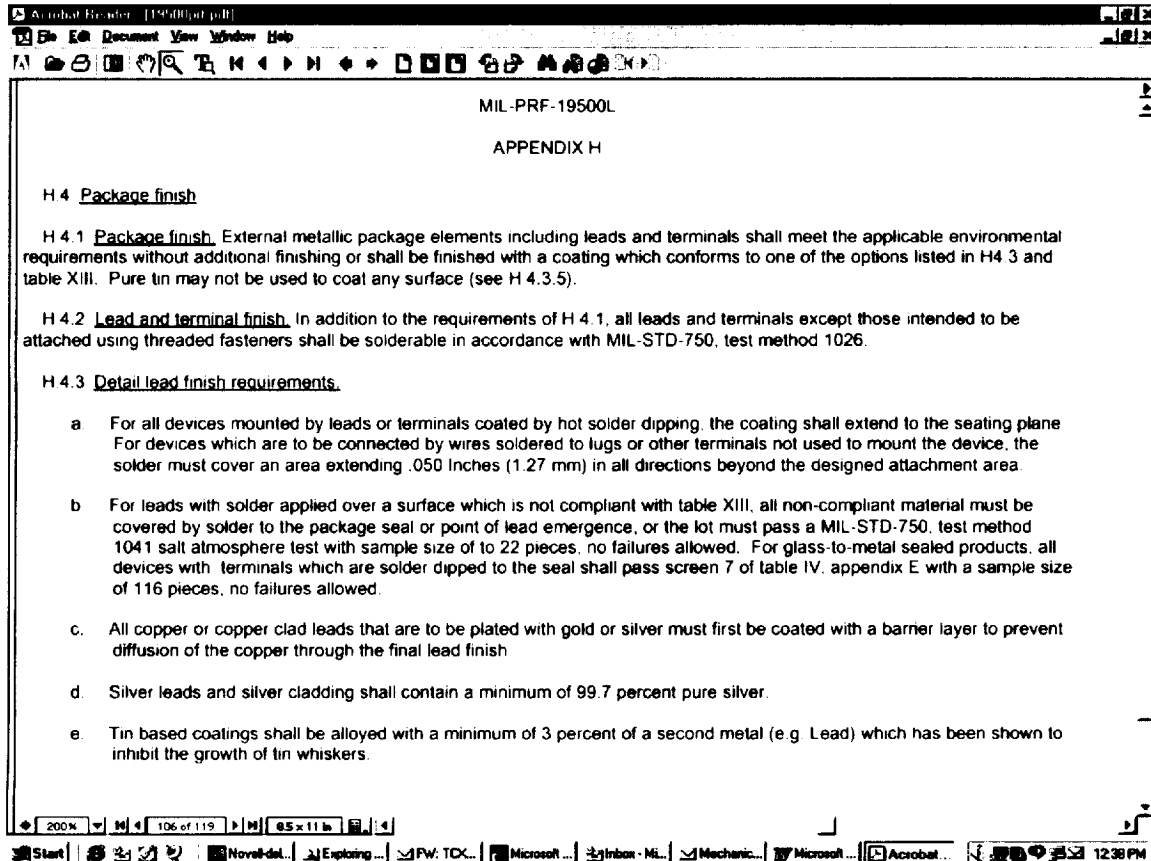
***"3.1 PROCUREMENT REQUIREMENTS. ALL DEVICES SHALL BE DESIGNED, MANUFACTURED, TRACEABLE, SCREENED, PACKAGED, SHIPPED AND PROTECTED AGAINST ESD DAMAGE AS SPECIFIED IN MIL-PRF-19500 AND SLASH SHEET 343 FOR JANTXV PRODUCT, EXCEPT AS OTHERWISE SET FORTH IN THIS SPECIFICATION. THE MANUFACTURER MUST BE LISTED IN QPL-19500 FOR THE 2N2857 DEVICE."***

MIL-PRF-19500/343 has the following paragraph on lead finish:

***"3.3.1 LEAD FINISH. LEAD FINISH SHALL BE SOLDERABLE AS DEFINED IN MIL-PRF-19500."***



MIL-PRF-19500 specifies the lead finish in paragraph H.4.3 and the package finish in H.4.1 below. MIL-PRF-19500 prohibits the use of pure tin as a package finish (see paragraph H.4.1 below) and lead finish (see paragraph H 4.3 e. below).



### 3.28 Transistor 48-P40305E

The following parts are contained in MOTOROLA INC. drawing 48-P40305E.

PART NUMBER	Make from Part Number
48-P40305E001	JANTXV2N2222AUB
48-P40305E002	JANTXV2N2907AUB
48-P40305E003	JANTXV2N5237
48-P40305E004	JANTXVR2N7262
48-P40305E005	JANTXVR2N7269
48-P40305E006	JANTXV4N49

The MOTOROLA INC. drawing, 48-P40305E, does not prohibit the use of pure tin or define the lead/package finish. This is a up-screen drawing that starts with MIL-PRF-19500 semiconductors. MIL-PRF-19500 specifies the lead finish in paragraph H.4.3 and the package finish in H.4.1 below.

MIL-PRF-19500 prohibits the use of pure tin as a package finish (see paragraph H.4.1 below) and lead finish (see paragraph H 4.3 e. below).

MIL-PRF-19500L

APPENDIX H

H 4 Package finish

H 4.1 Package finish. External metallic package elements including leads and terminals shall meet the applicable environmental requirements without additional finishing or shall be finished with a coating which conforms to one of the options listed in H 4.3 and table XIII. Pure tin may not be used to coat any surface (see H 4.3.5).

H 4.2 Lead and terminal finish. In addition to the requirements of H 4.1, all leads and terminals except those intended to be attached using threaded fasteners shall be solderable in accordance with MIL-STD-750, test method 1026.

H 4.3 Detail lead finish requirements.

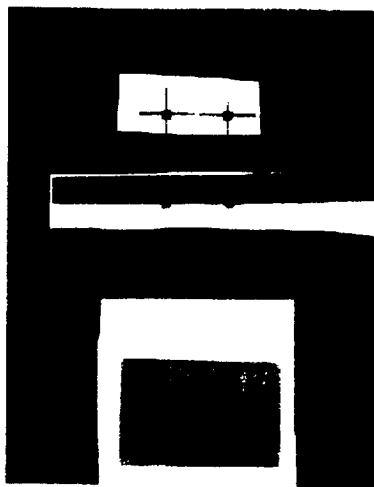
- a. For all devices mounted by leads or terminals coated by hot solder dipping, the coating shall extend to the seating plane. For devices which are to be connected by wires soldered to lugs or other terminals not used to mount the device, the solder must cover an area extending .050 Inches (1.27 mm) in all directions beyond the designed attachment area.
- b. For leads with solder applied over a surface which is not compliant with table XIII, all non-compliant material must be covered by solder to the package seal or point of lead emergence, or the lot must pass a MIL-STD-750, test method 1041 salt atmosphere test with sample size of 22 pieces, no failures allowed. For glass-to-metal sealed products, all devices with terminals which are solder dipped to the seal shall pass screen 7 of table IV, appendix E with a sample size of 116 pieces, no failures allowed.
- c. All copper or copper clad leads that are to be plated with gold or silver must first be coated with a barrier layer to prevent diffusion of the copper through the final lead finish.
- d. Silver leads and silver cladding shall contain a minimum of 99.7 percent pure silver.
- e. Tin based coatings shall be alloyed with a minimum of 3 percent of a second metal (e.g. Lead) which has been shown to inhibit the growth of tin whiskers.

200% 106 of 119 8.5 x 11.5

Start Novellet... Exploring... PW: TDX... Microsoft... Inher... Mi... Mechanic... Microsoft... Acrobat... 12:38 PM

## 3.29 Transistor, 48-P40309E003, M/A-COM MA42181-511TXV

MOTOROLA INC. drawing 48-P40309E does not specify the lead or body finish nor does it prohibit the use of pure tin as a lead or body finish. MOTOROLA INC. destructive physical analysis (DPA # 14066-011) on the MA42181-511TXV identified the package as ceramic/gold and the leads as gold plated.



DPA NO. 14066-011  
FIGURE NO. 6  
SAMPLE NO. 30144,00185  
MAG: 1x  
SUBJECT:  
RADIOGRAPH EXAMINATION

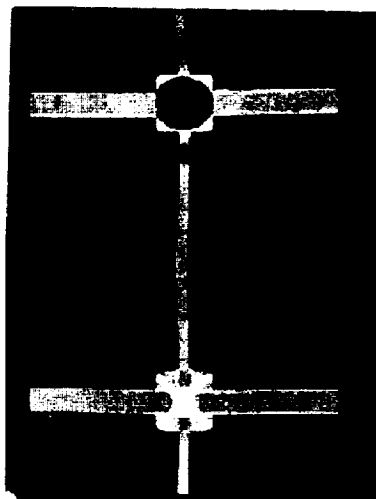


FIGURE NO. 6  
SAMPLE NO. SEE BELOW  
MAG: 9x  
SUBJECT:  
OVERALL OF SAMPLES SHOWING  
PART MARKING

DN 00124  
ST 00185

3.30 48-P49941D001, HP

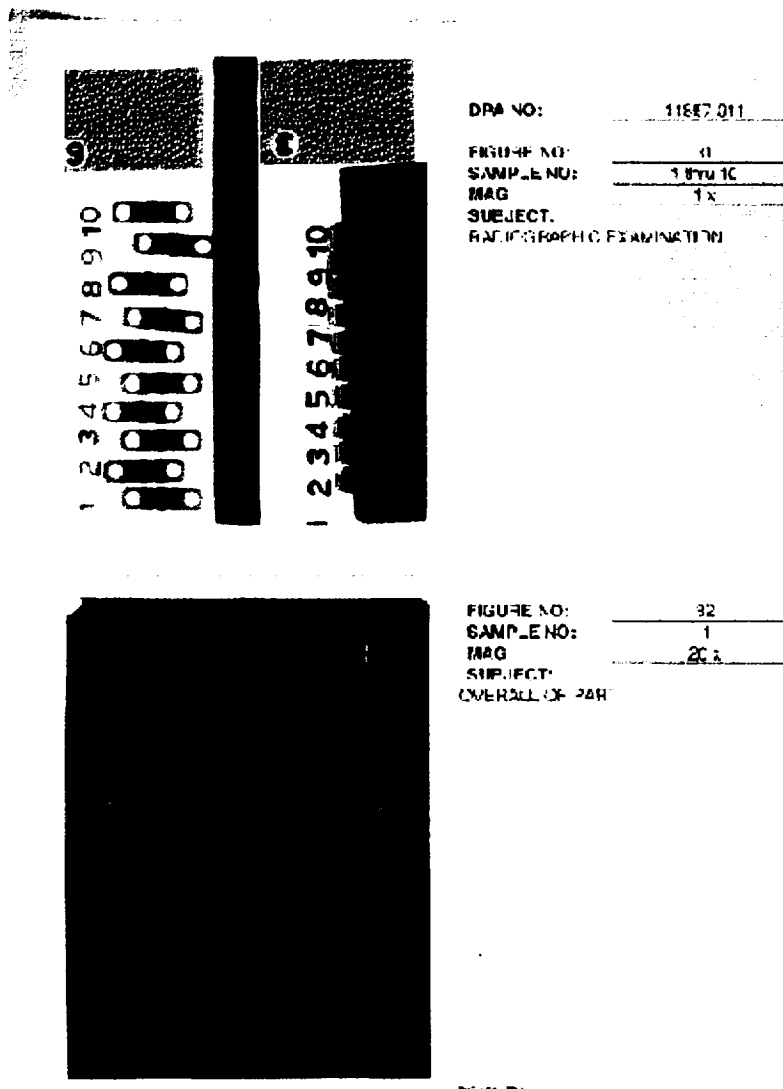
AT64023

MOTOROLA INC. drawing 48-P49941D specifies the lead finish as gold plated in the following paragraph.







*"3.1.2 LEAD FINISH. LEADS SHALL BE GOLD PLATED IN ACCORDANCE WITH MIL-PRF-19500."*

MOTOROLA INC. drawing 48-P49941D does not prohibit the use of a pure tin finish.

DPA report 11857-011 identifies the package as ceramic with no tin plating, see following insert. The leads are shown as gold plated in the DPA picture to the right.



DPAF NO. 11857-011

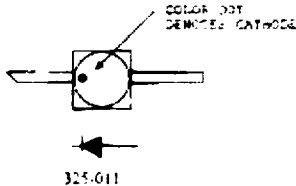
12	Review anomalies.	NONE		
13	SEM one device for step coverage. SEM anomalies if applicable.	AUG 13 1997		S/N S
14	For metal case device, determine case plating on one sample by EDS analysis.	N/A		Check for pure Cadmium or Zin CERAMIC
15	Review SEM results before performing Die Shear.	AUG 13 1997		PASS
16	Die Shear in accordance with paragraph 4.1.7. and MIL-STD-750, Method 2017.	AUG 13 1997		PASS S/N 1 + 1
17	Label and mount photos.	AUG 13 1997		
18	SIGN OFF REPORT.	AUG 13 1997	15397	

COMPONENT ENGINEER APPROVAL OF FLOW ON FILE

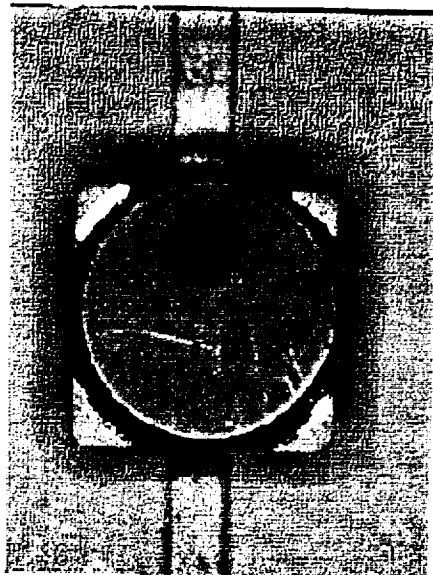
## 3.31 Diode Detector, DDC4717-89, DDC4717 ALPHA SEMICONDUCTORS

The lead finish is specified as gold in the following data sheet from Alpha Semiconductors.

The package finish is not specified. The following DPA report, 14066-003, identifies the package as gold plated. The part leads can be identified as gold from the DPA color photographs.

ALPHA INDUSTRIES		Alpha Part #: 94717-088		Rev.:
INTERNAL PRODUCT SPECIFICATION		ECO/DA No.:	Check By:	
Disposition:		Page 1 of 5		
Alpha Type:	DDC4717-85	Customer:	MOTOROLA	
Catalog Ref#:	DDC4717-24	Cust. Part#:	N/A	
Description:	P-TYPE ZERO BIAS DETECTOR	Gen. Spec #:	N/A	
Assembly Dwg. #:	N/A	Screening Level:	TXV	
Contents:	Page	Lead Finish:	gold plate	
Group A Testing	2	Package Outline #:	64 325 011	
100% screening	3			
Group B	4			
Group C	6			
Device Marking				
CAT-MOD DOT				
Special Mechanical:				
Label Per: 0050	Type: A23	Pack Per: 170030W	Type: BG1	Qty: 100
Labeling Notes:		Packing Notes:		
Report / Data: N/A		Notes:		





DPA NO: 14065-003

FIGURE NO: 5

SAMPLE NO: 121

MAG: 30 X

SUBJECT:

OVERALL OF PART SHOWING  
MARKING.

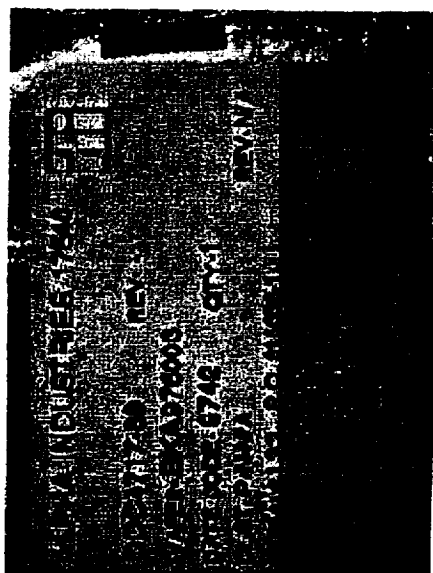


FIGURE NO: 6

SAMPLE NO: 122

MAG: 2 X

SUBJECT:

OVERALL OF PACKAGE LABEL.

PHI 08123-10

## 3.32 Diode, DSB4773-66, ALPHA

The lead and package finish are not specified in the Alpha Semiconductors data sheet. The following DPA report, 11880-146, identifies the package as gold plated. The part leads can be identified as gold from the DPA color photographs.



DPA NO: 11880-146  
 FIGURE NO: 5  
 SAMPLE NO: 8 & 24  
 MAG: 10x  
 SUBJECT:

OVERALL OF PARTS.

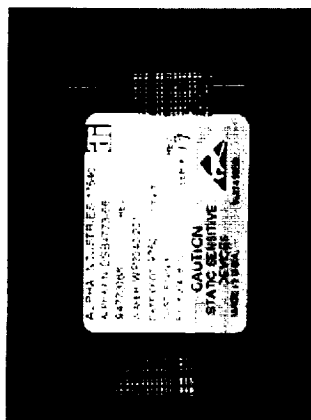
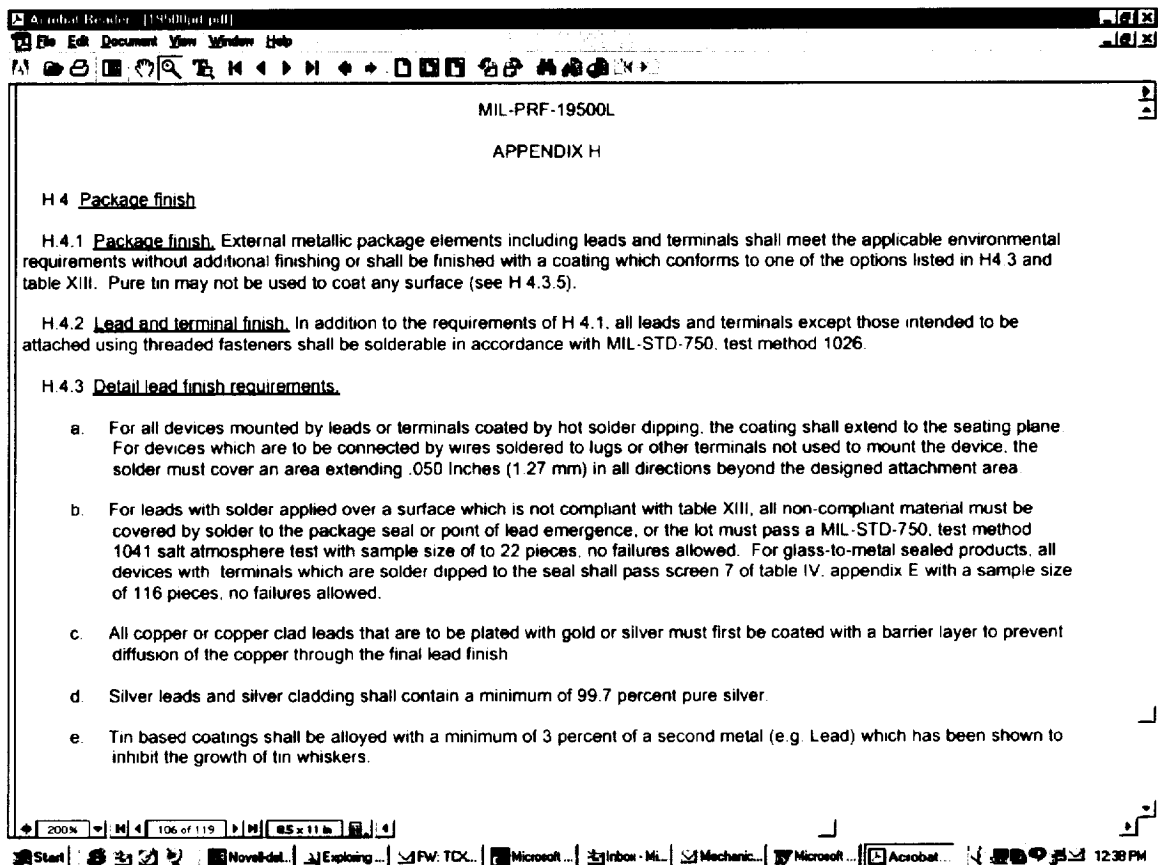


FIGURE NO: 6  
 SAMPLE NO: 19  
 MAG: 1.5x  
 SUBJECT:

OVERALL OF PACKAGE LABEL.

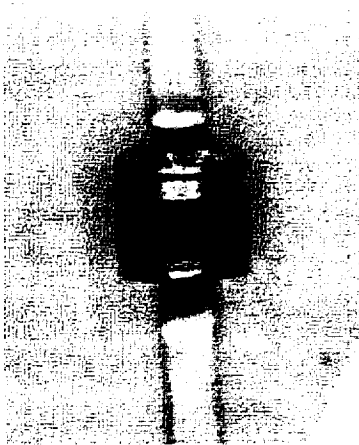
3.33 Diode, JANTXV1N4104UR-1, JANTXV1N4617DUR-1, JANTXV1N4625UR-1, JANTXV1N4958US, JANTXV1N5806US, JANTXV1N5819UR-1, JANTXV1N6626US, JANTXV1N6640US AND JANTXV1N829UR-1.

MIL-PRF-19500 specifies the lead finish in paragraph H.4.3 and the package finish in H.4.1 below. MIL-PRF-19500 prohibits the use of pure tin as a package finish (see paragraph H.4.1 below) and lead finish (see paragraph H 4.3 e. below).



## 3.34 MA40258-276TXV, M/A-COM MA40258

The following DPA report, 11880-061 shows the package and leads as gold plated.



DPA NO: 11880-061  
 FIGURE NO: 7  
 SAMPLE NO: 7  
 MAG: 24X  
 SUBJECT:  
 OVERALL OF PART  
 SHOWING PART MARKING

FIGURE NO: 8  
 SAMPLE NO: 25  
 MAG: 25X  
 SUBJECT:  
 OVERALL OF PACKAGE (APF)

MOTOROLA, INC SSTG  
 MA40258-276TXU  
 P D # 274797-11  
 S D # 37493  
 LOT# 120093 D/F 9  
 WAFER# 02242 B  
 S/N# 71

## 3.35 Diode, Varactor, MA45233-94TXV

The following DPA report, 11880-148, identifies the package as gold plated  
(gold-ceramic leadless package)



DPA NO: 11880-148

FIGURE NO: 7

SAMPLE NO: SEE BELOW

MAG: 25 x

SUBJECT:

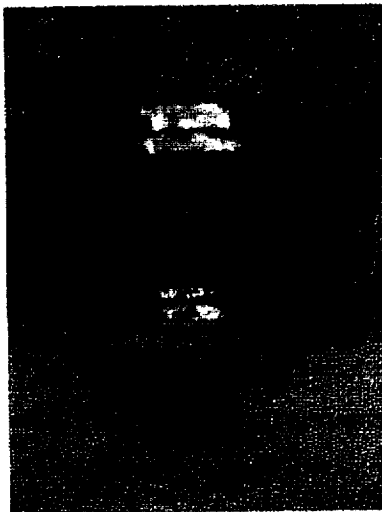
OVERALL OF PART SHOWING NO  
PART MARKING.

S/N 33

S/N 44

## 3.36 MA4ST563-94TXV, M/A-COM MA4ST563

The following DPA report, 11880-086 identifies the package as gold plated (gold-ceramic leadless package)



DPA NO:	11880-086
FIGURE NO:	5
SAMPLE NO:	1
MAG:	100x
SUBJECT:	
LITERATURE PART SHOWING MARKING.	

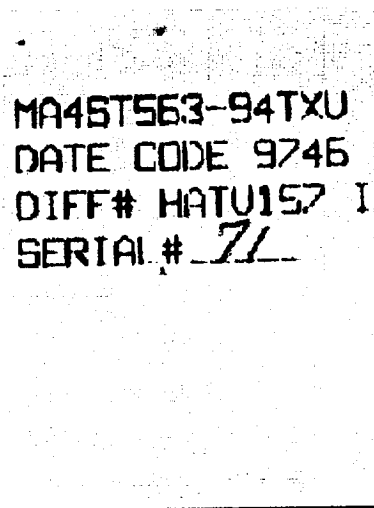


FIGURE NO:	6
SAMPLE NO:	1
MAG:	100x
SUBJECT:	
LITERATURE PACKAGE PART	

## 3.37 51-P24339N002, HP MSA0670

MOTOROLA INC. drawing 51-P24339N is a altered item drawing that upscreens HP's MMIC, part number MSA0670. The materials used in the MMIC are defined in the following HP data sheet. Both the package and the leads are gold plated.

HEWLETT-PACKARD / COMPONENTS 61E 3 4447564 0010101 596 HPA



**MSA-0670**  
MODAMP™ Casedable Silicon Bipolar  
Monolithic Microwave Integrated  
Circuit Amplifiers

#### Features

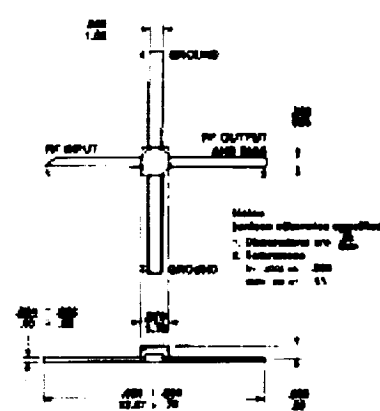
- Casedable 30 dB Gain Block
- Low Operating Voltage (3.5 V typical  $V_{CE}$ )
- 3 dB Bandwidth DC to 1.0 GHz
- High Gain: 18.5 dB typical at 0.5 GHz
- Low Noise Figure: 2.8 dB typical at 0.5 GHz
- Hermetic Gold-ceramic Microstrip Package

#### Description

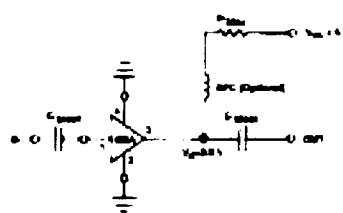
The MSA-0670 is a high performance silicon bipolar Monolithic Microwave Integrated Circuit (MMIC) housed in a hermetic, high reliability package. The MODAMP™ MMIC is designed for use as a general purpose 30 dB gain block. Typical applications include narrow and broad band IF and RF amplifiers in industrial and military applications.

The MODAMP MSA series is fabricated using a 10 GHz  $f_{max}$ , 25 GHz  $f_{max}$  silicon bipolar MMIC process which utilizes nitride self-alignment, ion implantation and gold metallization to achieve excellent uniformity, performance, and reliability. The use of an external bias resistor for temperature and current stability also allows bias flexibility.

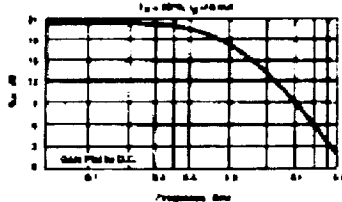
#### 70 mil Package



#### Typical Biasing Configuration



Typical Power Gain vs. Frequency



#### Electrical Specifications<sup>1</sup>, $T_A = 25^\circ\text{C}$

Symbol	Parameters and Test Conditions: $I_C = 10\text{ mA}$ , $Z_0 = 50\ \Omega$	Units	Min.	Typ.	Max.
$G_r$	Power Gain (dB) <sup>2</sup>	dB	18.0	20.5	22.0
$G_{dB}$	Gain (dB)	dB		20.2	21.2
$BW$	3 dB Bandwidth	GHz		1.0	
$V_{SWR}$	Input VSWR			1.5:1	
	Output VSWR			1.5:1	
$P_{1dB}$	Output Power @ 1 dB Gain Compression	dBm		2.0	
$NF$	1 dB Noise Figure	dB		2.8	4.2
$IP_3$	Third Order Intercept Point	dBm		16.5	
$t_d$	Group Delay	psec		200	
$V_{CE}$	Collector Voltage	V	3.0	3.5	3.9
$dV_{CE}/dT$	Collector Voltage Temperature Coefficient	mV/°C		-0.1	

Note 1: The recommended operating current range for this device is 12 to 30 mA. Typical performance as a function of current is on the following page.

## 3.38 51-P24339N003, HP MSA0770

MOTOROLA INC. drawing 51-P24339N is a altered item drawing that upscreens HP's MMIC, part number MSA0770. The materials used in the MMIC are defined in the following HP data sheet. Both the package and the leads are gold plated.



**MSA-0770**  
**MODAMP™** Cascadeable Silicon Bipolar  
 Monolithic Microwave Integrated  
 Circuit Amplifiers

### Features

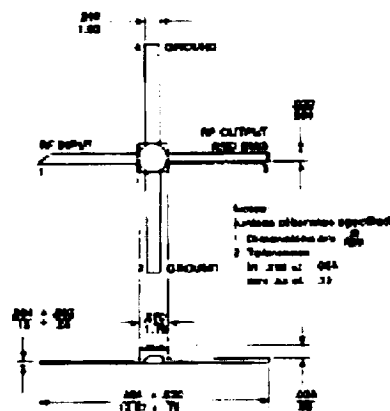
- Cascadeable 50  $\Omega$  Gain Block
- Low Operating Voltage (4.0 V typical  $V_{CE}$ )
- 3 dB Bandwidth: DC to 2.5 GHz
- 13.0 dB typical Gain at 1.0 GHz
- Unconditionally Stable ( $k > 1$ )
- Hermetic, Gold-ceramic Microstrip Package

### Description

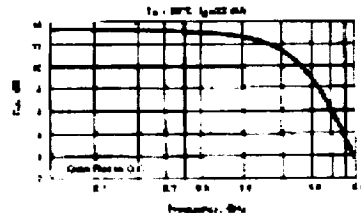
Avantek's MSA-0770 is a high performance silicon bipolar Monolithic Microwave Integrated Circuit (MMIC) housed in a hermetic high reliability package. The MODAMP™ MMIC is designed for use as a general purpose 50  $\Omega$  gain block. Typical applications include narrow and broad band IF and RF amplifiers in industrial and military applications.

The MODAMP MSA series is fabricated using a 10 GHz to 25 GHz  $f_{max}$  silicon bipolar MMIC process which affords precise self-alignment, ion implantation and gold metallization to achieve excellent uniformity, performance, and reliability. The use of an external base resistor for temperature and current stability also allows base flexibility.

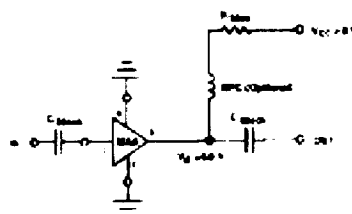
### Avantek 70 mil Package



Typical Power Gain vs. Frequency



Typical Biasing Configuration



Electrical Specifications\*,  $T_A = 25^\circ\text{C}$

Symbol	Parameters and Test Conditions: $I_B = 22 \text{ mA}$ , $Z_0 = 50 \Omega$	Units	Min	Typ	Max
$G_n$	Power Gain (50 $\Omega$ )	dB	12.5	13.0	14.5
$G_{max}$	Gain Fluctuation	dB		±0.6	±1.0
$BW_{3dB}$	3 dB Bandwidth	GHz		2.5	
$V_{SWRi}$	Input VSWR			2.0:1	
$V_{SWRo}$	Output VSWR			1.6:1	
$P_{out}$	Output Power (1% dBi Gain Compression)	dBm		5.0	
NF	SC-21 Noise Figure	dB		4.5	
IP3	Third Order Intercept Point	dBm		+9.0	
$V_{CE}$	Drain Voltage	V		1.0	
$V_{CE}$	Drain Voltage	V	3.0	4.0	4.5
$dV_{CE}/dT$	Drain Voltage Temperature Coefficient	mV/V/°C		-0.5	

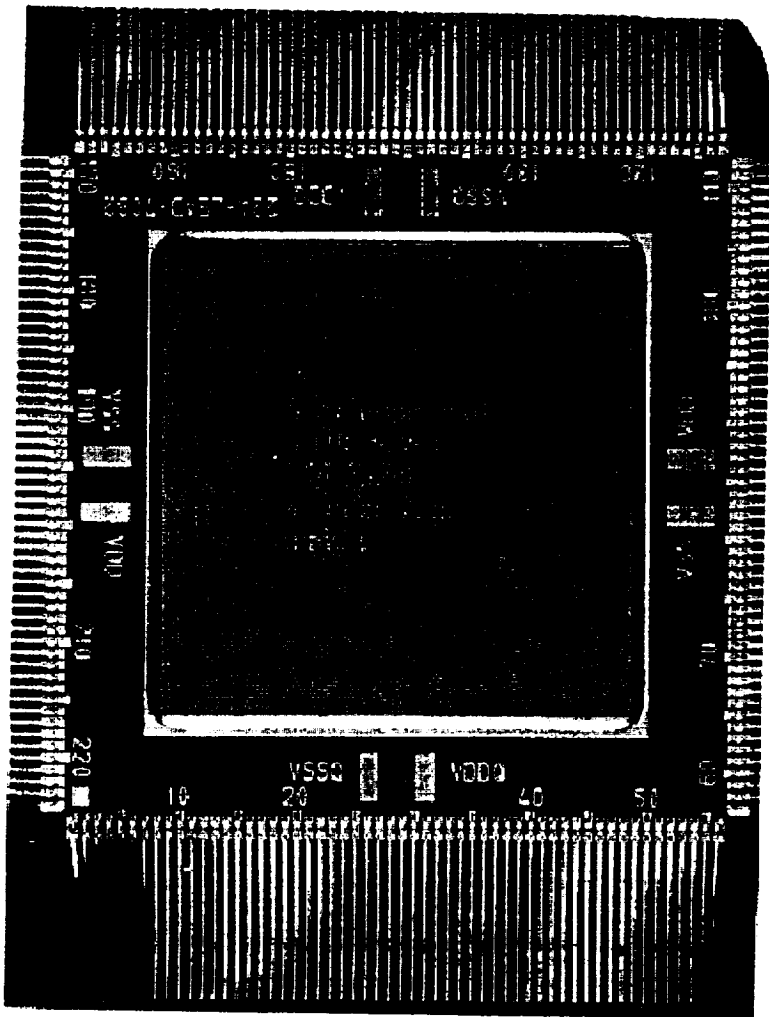
Note 1: The recommended operating current range for this device is 15 mA to 47 mA. Typical performance as a function of current is on the following page.

Avantek, Inc. • 1740 Mission Ave. Santa Clara, CA 95050 • Phone (408) 737-0700 • Fax (408) 737-0700 • Telex 250271 AVTEK • TWX 250271 AVTEK • Telex 250271 AVTEK • Telex 250271 AVTEK



## 3.39 51-P34222W001, ASIC

MOTOROLA INC. drawing 51-P34222W specifies the lead finish as finish C in accordance with Mil-M-38510 (gold plated). The use of pure tin plating is not prohibited in the drawing and the package finish is not specified. DPA report 10681-067 shows a gold finish for both the package and the leads.



DPA NO: 10681-067

FIGURE NO: 3

SAMPLE NO: 012

MAG: 3 X

SUBJECT:

OVERALL OF PART MARKING.

## 3.40 51-P34227W001, D/A Converter 5962-9306201MXA (AD9720TQ/883)

The MOTOROLA INC. drawing, 51-P34227W001, does not specify the lead finish or prohibit the use of pure tin. The MOTOROLA INC. drawing is a upscreen document that uses the 5962-9306201MXA as the device derivative.

1.1 Scope. This drawing forms a part of a one part, one part number documentation system (see 6.6 herein). Two product assurance classes consisting of military high reliability (device classes Q and Y) and space application (device class V), and a choice of case outlines and lead finishes are available and are reflected in the Part or Identifying Number (PIN). Device class R microcircuits represent non-JAN class B microcircuits in accordance with 1.2.1 of MIL-STD-883. "Provisions for the use of MIL-STD-883 in conjunction with compliant non-JAN devices". When available, a choice of Radiation Hardness Assurance (RHA) levels are reflected in the PIN.

1.2 PIN. The PIN shall be as shown in the following example:

5962	93062	01	4	Y	A
Federal stock class designator (see 1.2.1)	RMA designator (see 1.2.1)	Device type (see 1.2.2)	Device class designator (see 1.2.3)	Case outline (see 1.2.4)	Lead finish (see 1.2.5)

Drawing number

1.2.1 RMA designator. Device class R RMA marked devices shall meet the MIL-I-38535 appendix A specified RMA level and shall be marked with the appropriate RMA designator. Device classes Q and Y RMA marked devices shall meet the MIL-I-38535 specified RMA level and shall be marked with the appropriate RMA designator. A dash (-) indicates a non RMA device.

1.2.2 Device type(s). The device type(s) shall identify the circuit function as follows:

Device type	Circuit number	Circuit function
01	AD9720	10-Bit, 400 Kbps, ECL compatible D/A Converter
02	AD9721	10-Bit, 100 Kbps, TTL compatible D/A Converter

1.2.3 Device class designator. The device class designator shall be a single letter identifying the product assurance level as follows:

Device class	Device requirements documentation
R	Vendor self-certification to the requirements for non-JAN class B microcircuits in accordance with 1.2.1 of MIL-STD-883
Q or Y	Certification and qualification to MIL-I-38535

1.2.4 Case outline(s). The case outline(s) shall be as designated in MIL-STD-883 and as follows:

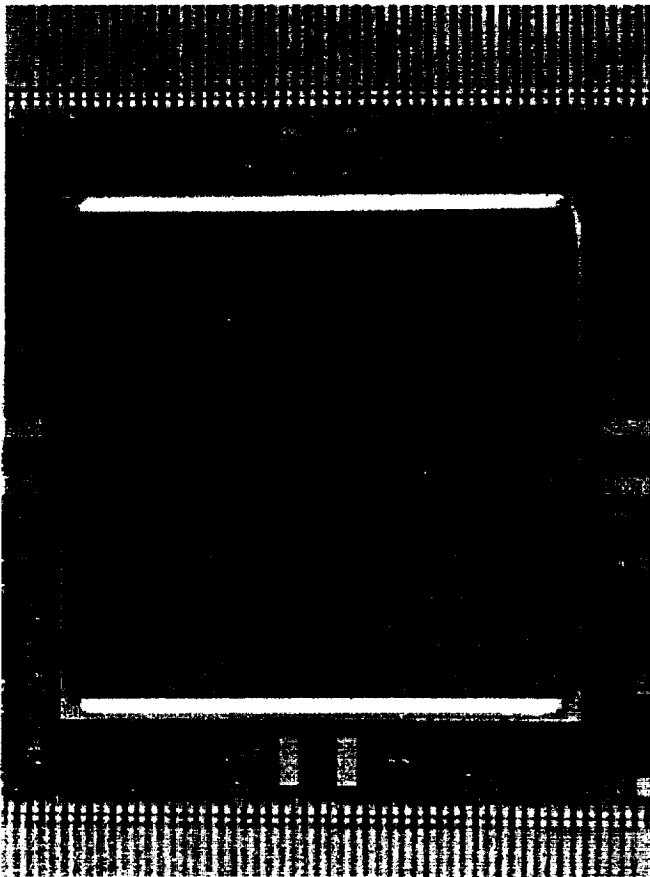
Outline letter	Descriptive designation	Terminals	Package style
1	CDIP-128 or CDIP2-128	28	Dual in-line
3	CDIC-128	28	Leadless chip carrier

1.2.5 Lead finish. The lead finish shall be as specified in MIL-STD-883 (see 3.1 herein) for class R or MIL-I-38535 for classes Q and Y. Finish letter "A" shall not be marked on the microcircuit or its packaging. The "X" designation is for use in specifications when lead finishes A, B, and C are considered acceptable and interchangeable without preference.

Lead finish A is hot solder dip and the package is a ceramic dual in-line.

## 3.41 51-P40302E001, 5962R96B0207QNC RCVR ASIC

MOTOROLA INC. drawing number 51-P40302E does not specify the lead or package finish for this ASIC. The MOTOROLA INC. drawing does refer to DESC part number 5962R96B0207QNC as the make from or base part that is altered by the MOTOROLA INC. drawing. The last letter in the DESC part number (C) identifies the lead finish as gold. The following DPA report 11702-002 shows both



DPA NO: 11702-002

FIGURE NO: 5

SAMPLE NO: 1

MAG: 2 x

SUBJECT:

OVERALL OF PART SHOWING FRONT  
MARKING.

the leads and the package as gold plated.

3.42 51-P40306E001, 5962-8680601FX (SG1846F)

MOTOROLA INC. drawing number 51-P40306E001 does not specify the lead or package finish. The MOTOROLA INC. drawing does refer to DESC part number 5962-8680601FX as the make from or base part that is altered by the MOTOROLA INC. drawing. The last letter in the DESC part number (X) identifies the lead finish in accordance with MIL-M-38510 which allows a tin finish if the plating is fused.

Acrobat Reader [18910.pdf]  
 File Edit Document View Window Help

TABLE II. Lead finish systems.

Finish	Applied over		Required underplate		
	Gold plate	Tin plate	Electroplated nickel	Electroless nickel 1/	None
Not solder dip 2/			X		X
Not solder dip 2/				X	
Not solder dip 2/		X			X
Not solder dip 2/		X	X	X	
Not solder dip 2/	X		X	X	
Not solder dip 2/	X			X	
Tin plate 3/			X	X	X
Tin plate 3/					
Tin plate 3/					
Tin-lead plate 3/			X		X
Tin-lead plate 3/		X		X	
Tin-lead plate 3/		X	X	X	
Tin-lead plate 3/		X		X	
Tin-lead plate 3/			X	X	
Gold plate			X		
Gold plate				X	

1/ Electroless nickel shall not be used as the undercoat on flexible or semi-flexible leads (see 3.3.1 and 3.3.2 of method 2004 of MIL-STD-883) and shall be permitted only on rigid leads or package elements other than leads.

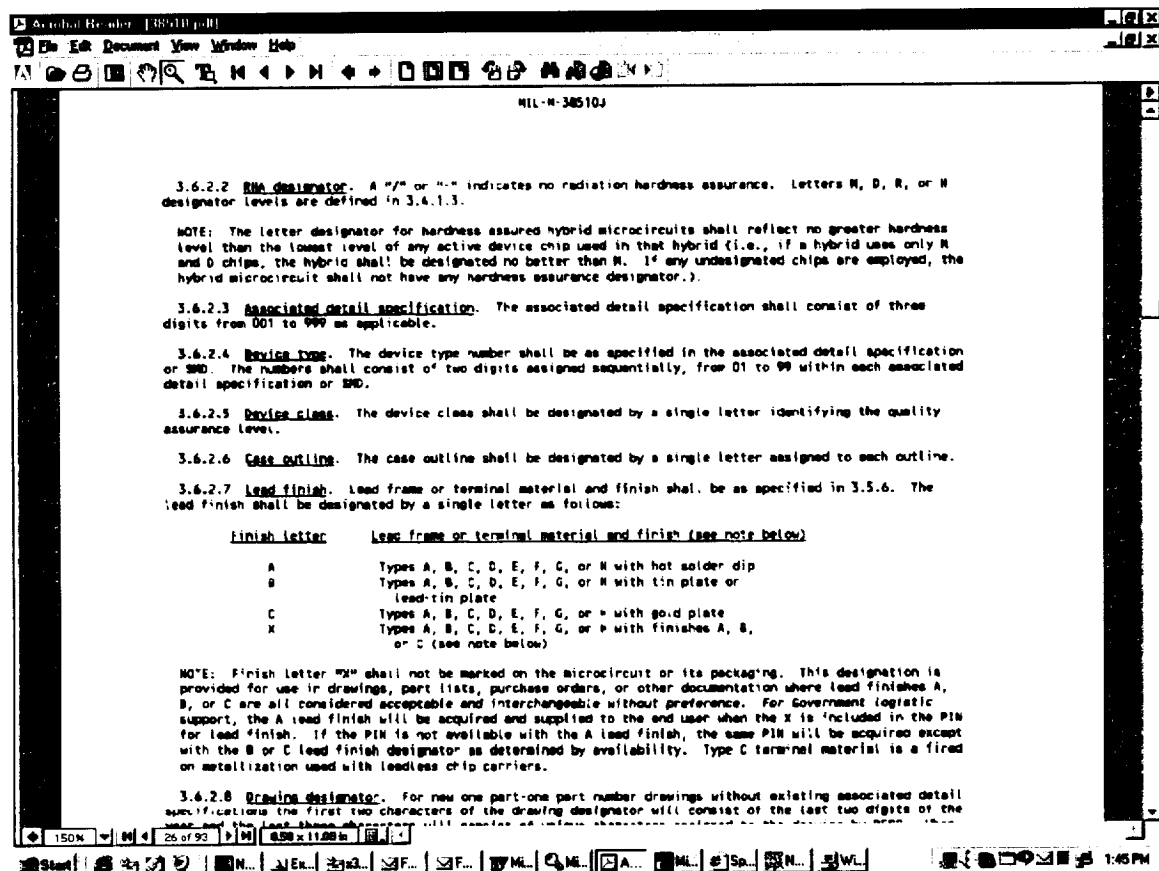
2/ Not solder dip shall be applied in accordance with 3.5.6.3.4.

3/ Tin plate shall be fused in accordance with 3.5.6.3.5. Fusing of tin lead plating is

150W 21 of 93 85x1101

Start [Icons] N... Ek... F... F... ML... ML... #1 Sp... N... WL... 1:27 PM

The lead finish is defined by the last letter in the part number. The “X” finish allows any of the specified finishes.



Mil-M-38510 allows a tin finish on the package if the tin plating is fused.

TABLE IV. Package element (other than leads/terminals) finish system.

Finish	Applied over		Required underplate			
	Gold plate	Tin plate	Electroplated nickel 1/	Electroless nickel 1/	Nickel cladding 1/	None
Hot solder dip			X			X
Hot solder dip				X		
Hot solder dip		X			X	X
Hot solder dip		X	X			
Hot solder dip		X		X		
Hot solder dip	X		X		X	
Hot solder dip	X			X		
Hot solder dip	X				X	
Tin plate 2/			X			X
Tin plate 2/				X		
Tin plate 2/					X	
Tin plate 2/						X
Tin-lead plate 2/			X			
Tin-lead plate 2/				X		
Tin-lead plate 2/		X			X	X
Tin-lead plate 2/		X				
Tin-lead plate 2/		X	X			
Tin-lead plate 2/		X		X		
Tin-lead plate 2/		X			X	
Gold plate 1/			X			
Gold plate 1/				X		
Gold plate 1/					X	
Electroplated nickel 1/						X
Electroless nickel 1/						X

## 3.4.3

51-P40306E004	5962-8960101MSA	54ACT574
51-P40306E006	5962R8775901BSA	54ACT240
51-P40306E008	M38510/10104BHA	LM108W
51-P40306E008	M38510/10104BHA	LM108W
51-P40306E008	M38510/10104BHA	LM108W
51-P40306E008	M38510/10104BHA	LM108W
51-P40306E009	M38510/11005BDA	LM124W
51-P40306E009	M38510/11005BDA	LM124W
51-P40306E009	M38510/11005BDA	LM124W
51-P40306E010	M38510R75201BDA	54AC32
51-P40306E011	M38510R75702BDA	54AC14
51-P40306E012	M38510R75705BSA	54AC244
51-P40306E020	5962-9468001M2A	OP27
51-P40306E021	M38510R75202BDA	54AC86

MOTOROLA INC. drawing number 51-P40306E does not specify the lead or package finish. The MOTOROLA INC. drawing does refer to DESC part number 5962xxxxxxxxxxA as the make from or base part that is altered by the MOTOROLA INC. drawing. The last letter in the DSC part number (A) identifies the lead finish as solder dip in accordance with MIL-M-38510. The lead finish is defined in the Standard Military Drawing as the last letter of the part number. Mil-M-38510 is the controlling document for device class M, B and S. Mil-M-38510 defines finish A as hot solder dip.

1. SCOPE

1.1 **Scope.** This drawing forms a part of a one part - one part number documentation system (see 6.6 herein). Two product assurance classes consisting of military high reliability (device classes B, Q, and M) and space application (device classes S and V) and a choice of case outlines and lead finishes are available and are reflected in the Part or Identifying Number (PIN). Device class M microcircuits represent non-JAN class B microcircuits in accordance with 1.2.1 of MIL-STD-883, "Provisions for the use of MIL-STD-883 in conjunction with compliant non-JAN devices". When available, a choice of radiation hardness assurance (RHA) levels are reflected in the PIN.

1.2 **PIN.** The PIN shall be as shown in the following example:

5962	-	89601	01	M	R	X
Federal stock class designator (See 1.2.1)		RHA designator (See 1.2.1)	Device type (See 1.2.2)	Device class designator (See 1.2.3)	Case outline (See 1.2.4)	Lead finish (See 1.2.5)

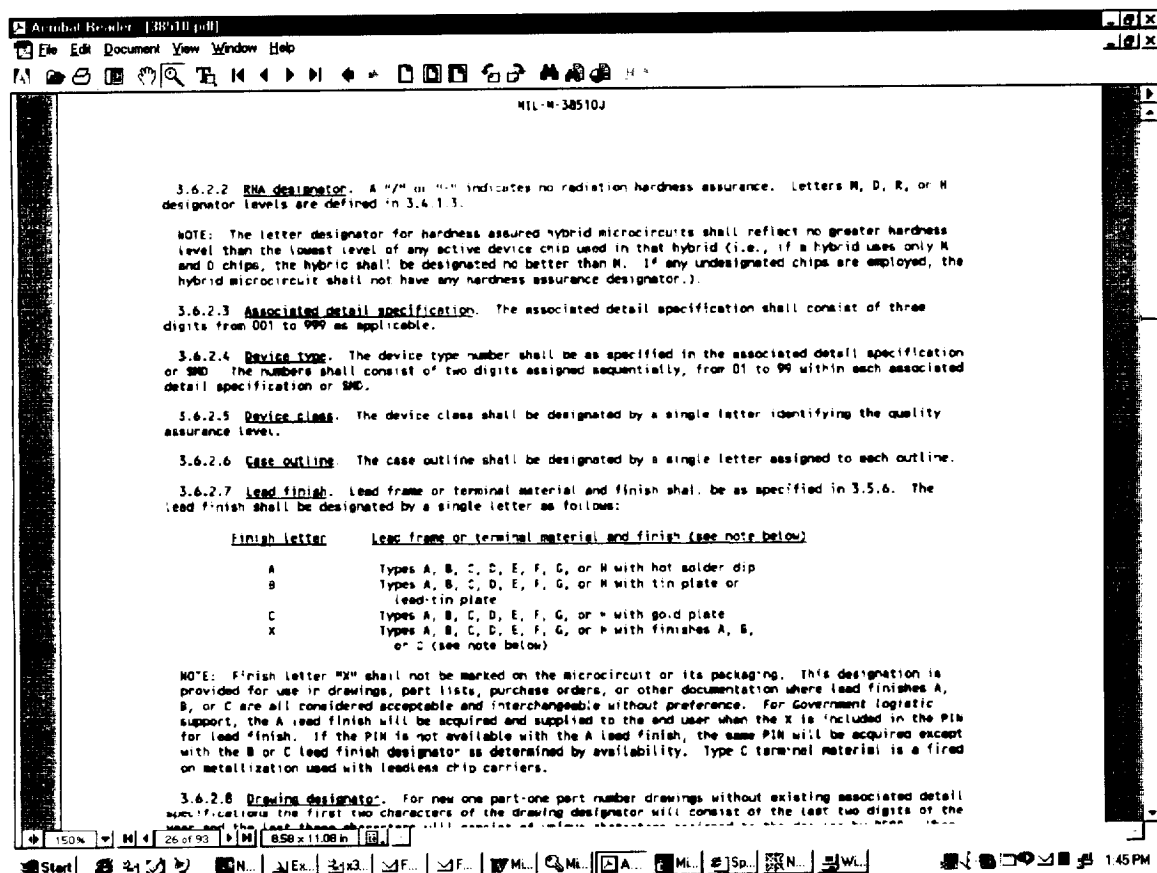
Drawing number

1.2.1 **Radiation hardness assurance (RHA) designator.** Device classes M, B, and S RHA marked devices shall meet the MIL-M-38510 specified RHA levels and shall be marked with the appropriate RHA designator. Device classes Q and V RHA marked devices shall meet the MIL-I-38535 specified RHA levels and shall be marked with the appropriate RHA designator. A dash (-) indicates a non-RHA device.

1.2.2 **Device type(s).** The device type(s) shall identify the circuit function as follows:

Device type	Generic number	Circuit function
01	54ACT574	Octal, positive-edge triggered, D-type, flip-flop with three-state outputs. TTL compatible inputs.

1.2.3 **Device class designator.** The device class designator shall be a single letter identifying the product assurance level as follows:

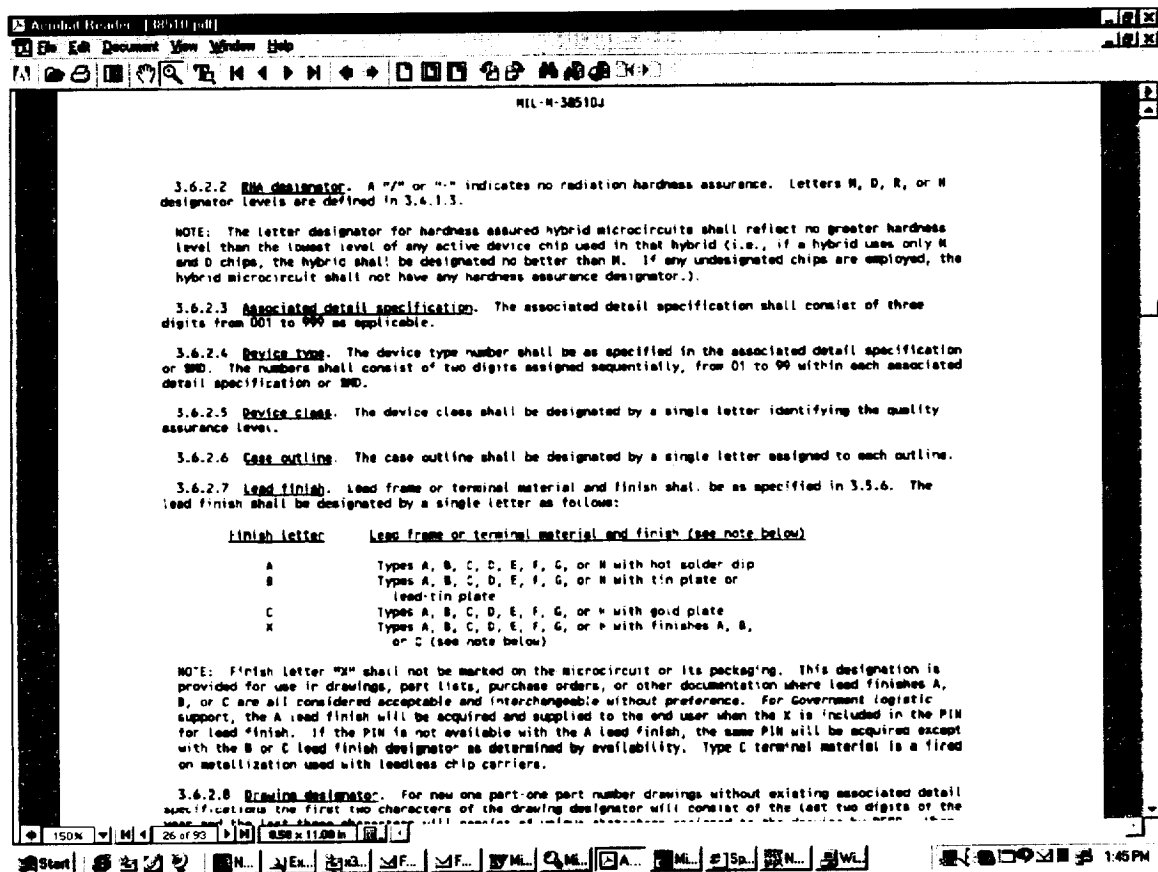


3.44 51-P40306E005, 5962-9234701MXC (AD9696)

51-P40306E019, 5962R9322603QZC (UT63M147CBA)

51-P40306E015, 5962-9099301MPC (CLC505)

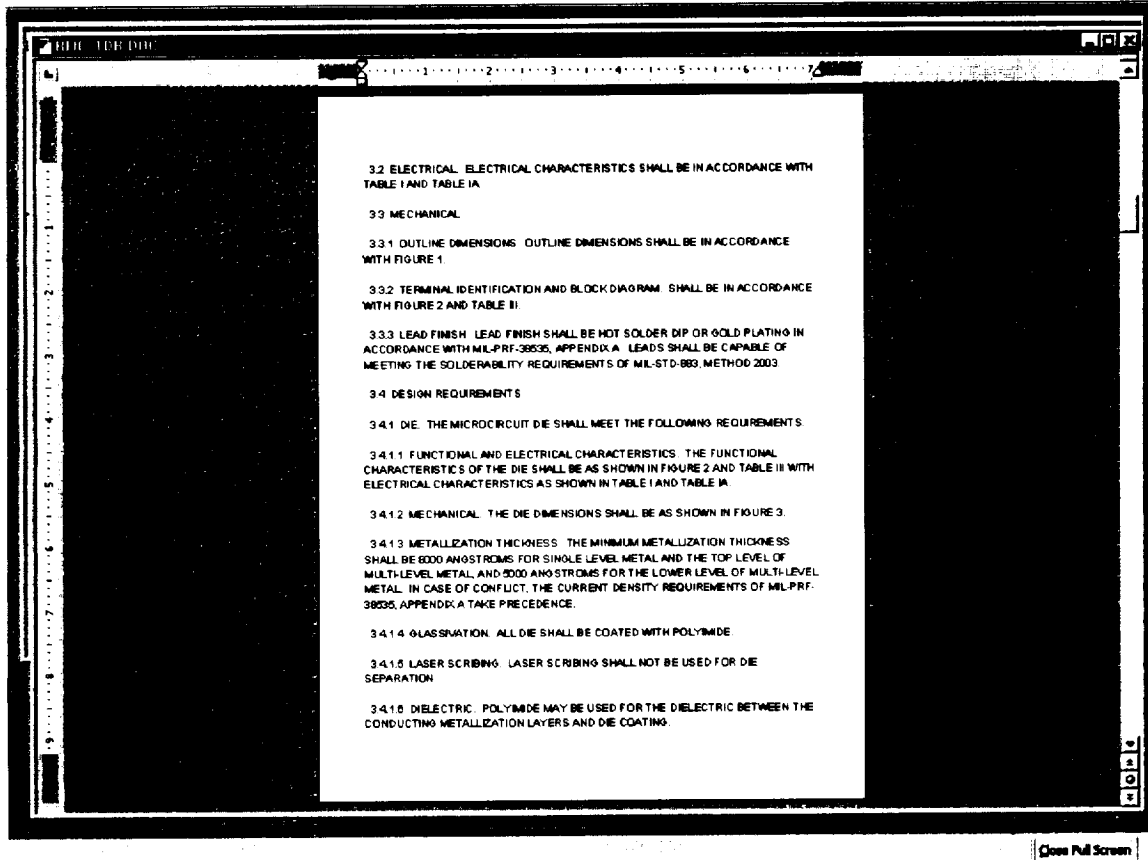
MOTOROLA INC. drawing number 51-P40306E does not specify the lead or package finish. The MOTOROLA INC. drawing does refer to DESC part number 5962xxxxxxxxxC as the make from or base part that is altered by the MOTOROLA INC. drawing. The last letter in the DESC part number, C, identifies the lead finish as gold in accordance with MIL-M-38510.



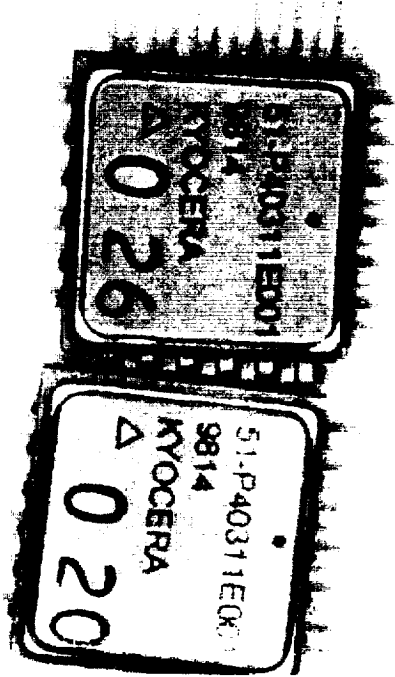


### 3.45 51-P40311E001, RFIC

The lead finish is specified as hot solder dip or gold plated in the MOTOROLA INC. drawing 51-P40311E.



The DPA photograph shows a gold plated package and leads.



DPA NO: 11880-194

FIGURE NO: 5

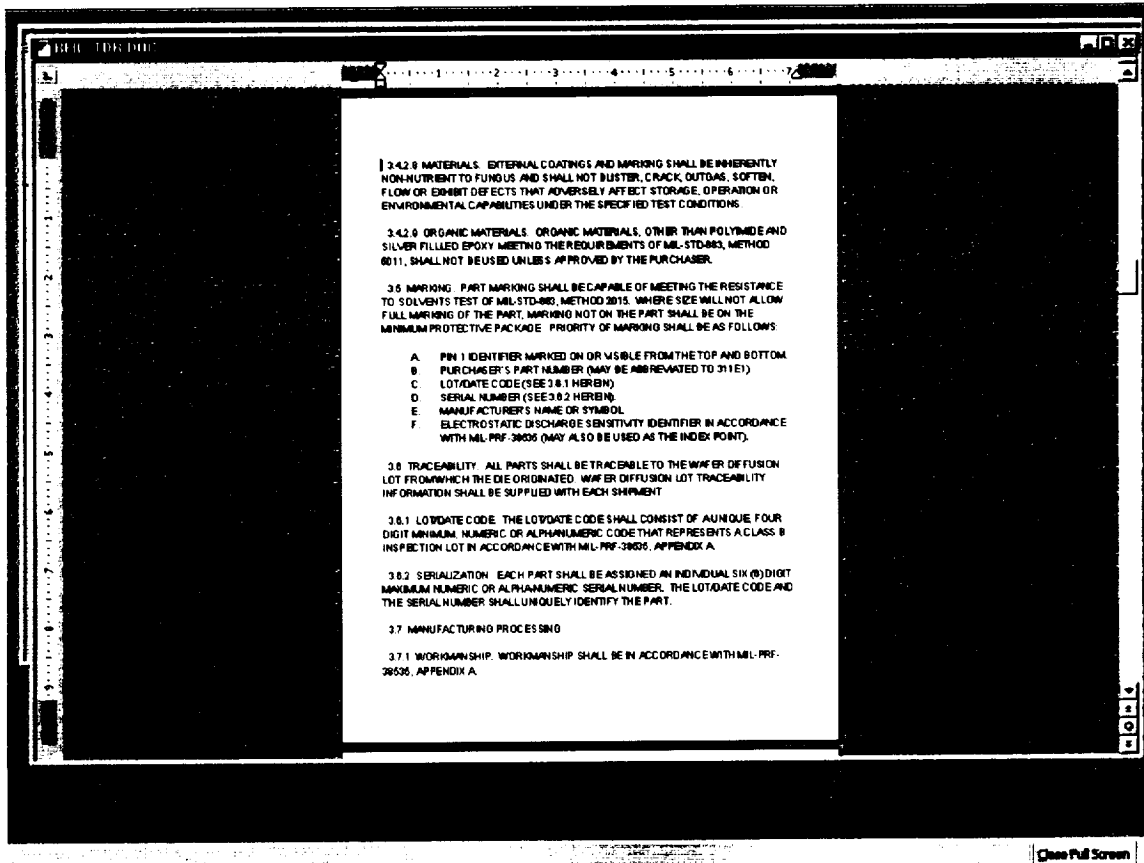
SAMPLE NO: 020 2 026

MAG: 5X

SUP: 51

PART NO: 51-P4031E001

Pure tin is prohibited as a finish on the lid or package.



## 3.46 51-P40312E001, HS1-5104RH-Q

The MOTOROLA INC. drawing, 51-P40312E, does not specify the lead or body finish nor does it prohibit the use of pure tin. The following DPA photograph shows gold plated package and leads.

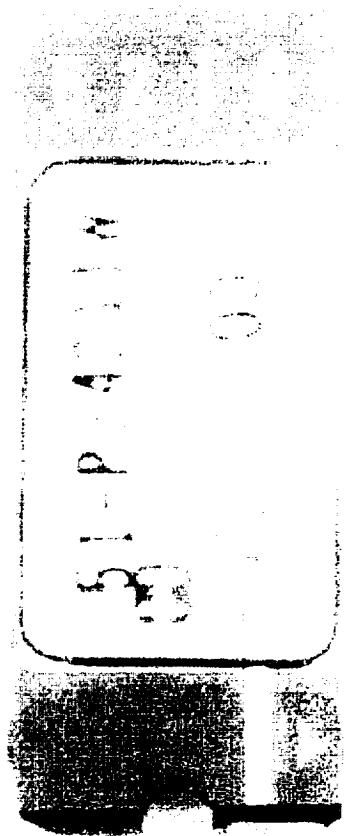


FIGURE N-1

4

SAMPLE NO.

0129

MAG.

5x

SUBJECT:

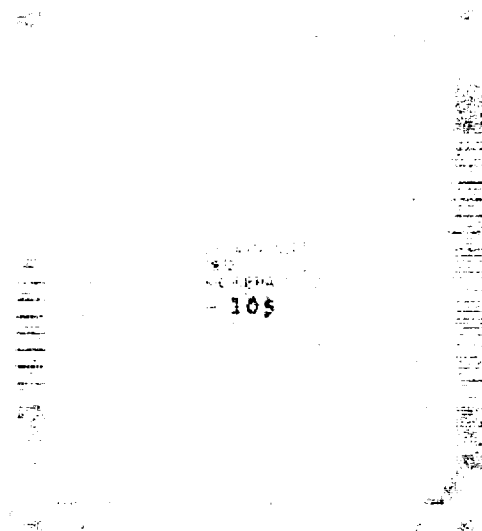
OVERALL OF PART SHOWING TOP  
MARKING.

PAC\_0129.FRM

### 3.47 51-P40322E001, UPCONVERTER ASIC

The MOTOROLA INC. drawing, 51-P40312E, does not specify the lead or body finish nor does it prohibit the use of pure tin. The following DPA photograph shows gold plated package and leads for the Upconverter ASIC.

DPA NO: 11883-192  
FIGURE NO: 9  
SAMPLE NO: 105  
MAG: 2x  
REVIEWED:  
OVERALL OF PART, INCLUDING  
MARKING



## 3.48 5962F9568901VXC, 5962F9666301VXC (HS9-26C31 AND C32)

The DESC drawing specifies the lead finish as gold plated (C).

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1. DESCRIPTOR

1.1. **Scope:** This drawing document three product assurance class levels consisting of their reliability, device classes (A, M, space applications), device class (V), and the appropriate satellite and similar applications (device class T). A choice of case outlines and lead finishes are available and are reflected in the Part or Identifying Number (PIN). When available, a choice of radiation hardness Assurance (RMA) levels are reflected in the PIN. For device class T, the user is encouraged to review the manufacturer's Quality Management (QM) data as part of the evaluation of these parts and their availability in the intended application.

1.2. **Pin:** The PIN is as shown in the following examples:

Part or Identifying Number (PIN)	Device Class	Device Type	Case Outline	Lead Finish
5962F9568901VXC	Device Class V	Device Type T	Case Outline 1	Lead Finish C
5962F9666301VXC	Device Class V	Device Type T	Case Outline 1	Lead Finish C

Drawing number

1.3. **RMA Designation:** Device classes U, T, and V RMA marked devices meet the MIL-PRF-38537 specified RMA levels and are marked with the appropriate RMA designation. Device class M RMA marked devices meet the MIL-PRF-38537, appendix A specified RMA levels and are marked with the appropriate RMA designation. A (38537) indicates a non-RMA device.

1.4. **Device Function:** The device function identifies the circuit function as follows:

Device Type	Device Function	Device Function
U	OT	Radiation hardened dual in-line device

1.5. **Device Class Designation:** The device class designation is a single letter identifying the product assurance level as follows:

Device Class	Device Requirements Documentation
V	Vendor self certification to the requirements for MIL-STD-883C compliant non-space class level B microcircuits in accordance with MIL-PRF-38537, appendix A.
U	Certification and qualification to MIL-PRF-38537.
T	Certification and qualification to MIL-PRF-38537 with performance as specified in the device manufacturer's approved quality management plan.

1.6. **Case Outline:** The case outlines are as designated in MIL-STD-1835 and as follows:

Case Outline	Case Outline Designation	Case Outline	Case Outline
1	1835-110	16	Dual in-line
2	1835-110	16	Flat pack

1.7. **Lead Finish:** The lead finish is as specified in MIL-PRF-38537 for device classes U, T, and V or MIL-PRF-38537, appendix A for device class M.

100% 2 of 23 65 x 11 in

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## 3.49 AM85-0007-S

DPA report 11702-003 shows a gold package and leads.

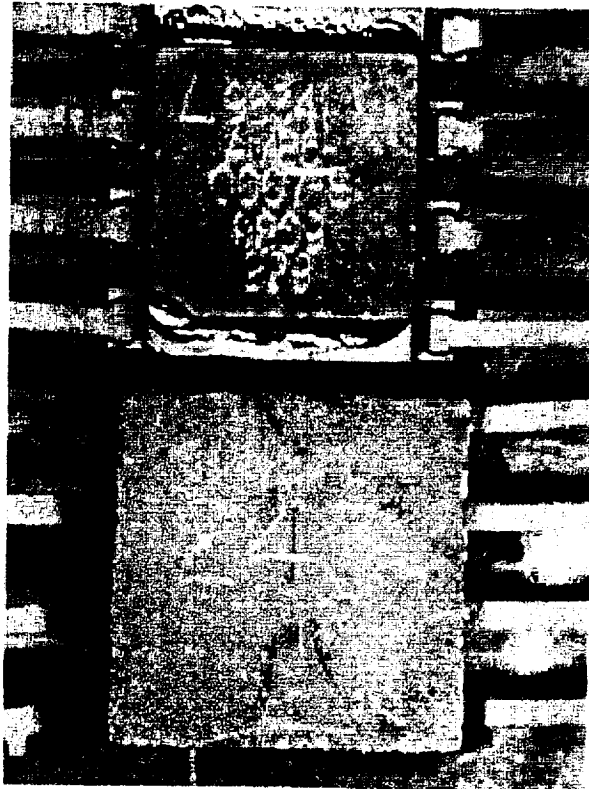


FIGURE NO: 10

SAMPLE NO: 229 & 243

MAG: 15x

SUBJECT:

OVERALL OF PARTS SHOWING  
MARKING.

PWT\_0242.FRM

3.50 GSFC-735-2827-01, GSFC ESN MCM

DPA report 11880-151 shows a gold package and leads.

DPA NO: 11880-151

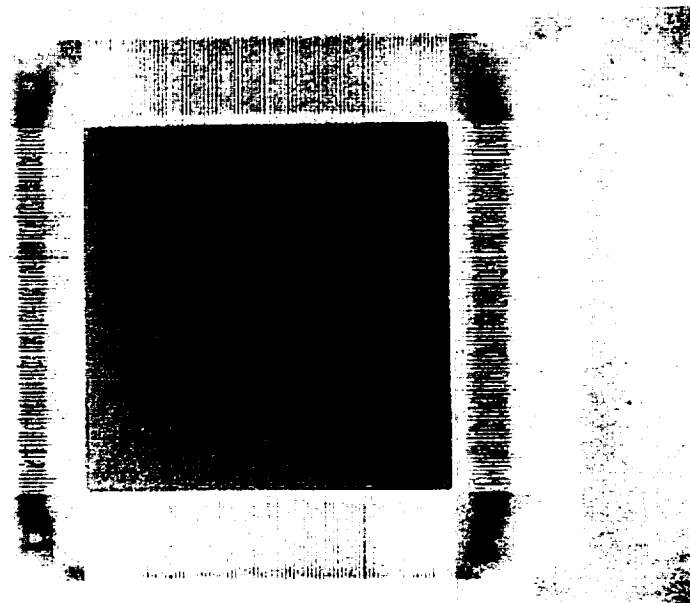
FIGURE NO: 27

SAMPLE NO: 007

MAG: 2 x

SUBJECT:

OVERALL OF PART SHOWING  
MARKING





## 3.51 MCM2760-8M, OSCILLATOR

The DPA report 11880-060 shows a gold package and leads.

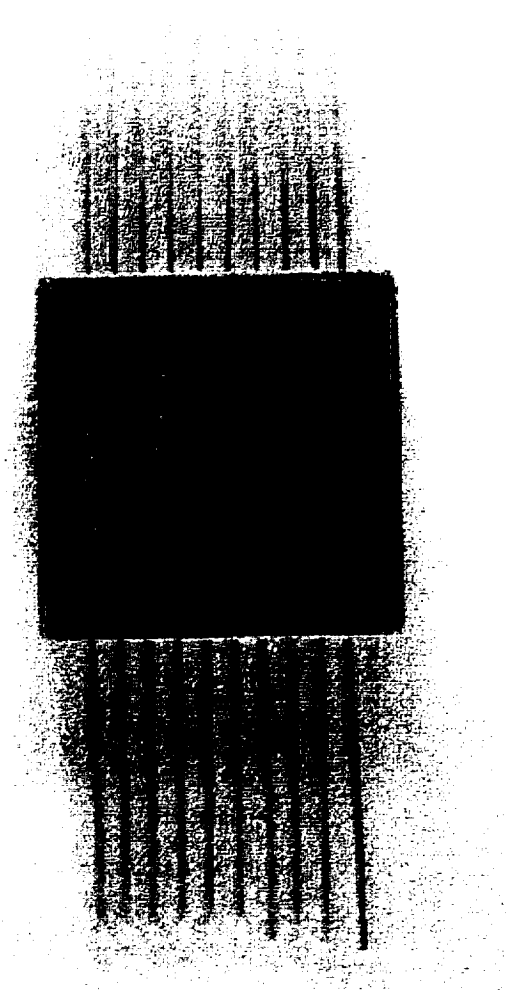


FIGURE NO:

18

SAMPLE NO:

78.8

MAG.

2x

SUBJECT

OVERALL OF PART SHOWING  
MARKING.

PHOTOGRAPH

### 3.52 58-P34232W001, ISOLATOR

MOTOROLA INC. drawing 58-P34232W requires a gold electroplate finish on both the housing and the cover, but does not prohibit the use of pure tin.

**3.3.3 HOUSING AND COVER FINISH.** HOUSING FINISH SHALL BE ELECTROLESS NICKEL IN ACCORDANCE WITH MIL-C-28074, CLASS 1, THICKNESS 0.0005 INCH MINIMUM, EXCEPT FOR THE 000003 PART WHERE THE HOUSING FINISH SHALL BE GOLD ELECTROPLATE IN ACCORDANCE WITH MIL-G-45204, TYPE III, THICKNESS 0.00009 TO 0.00013 INCH WITH NO UNDERPLATE. THE COVER FINISH SHALL BE ELECTROLESS NICKEL PLATE IN ACCORDANCE WITH MIL-C-28074, CLASS 1, THICKNESS 0.0001 INCH MINIMUM, EXCEPT FOR THE 000003 PART WHERE THE COVER FINISH SHALL BE GOLD ELECTROPLATE IN ACCORDANCE WITH MIL-G-45204, TYPE I, THICKNESS 0.00005 TO 0.00015 INCH OVER ELECTROLESS NICKEL IN ACCORDANCE WITH MIL-C-28074, CLASS 1, THICKNESS 0.00005 TO 0.0001 INCH.

**3.3.4 CHIP RESISTORS.** IF AVAILABLE, CHIP RESISTORS SHALL BE PROCURED TO MIL-R-35542, FAILURE RATE LEVEL B OR BETTER. AS A MINIMUM, CHIP RESISTORS SHALL BE SPECIFIED TO GROUPS A & B OF MIL-R-35542. WHEN APPLICABLE, CHIP-TYPE RESISTOR TERMINATION AREAS SHALL UTILIZE A NICKEL BARRIER TO PREVENT LEACHING DURING THE TAB SOLDERING OPERATION (ISOLATORS ONLY).

**3.4 MARKING.** PART MARKING SHALL BE CAPABLE OF MEETING THE REQUIREMENTS TO SOLVENT TEST OF MIL-STD-202, METHOD 215. THE PART SHALL BE MARKED WITH THE FOLLOWING INFORMATION:

- A. PURCHASER PART NUMBER (SEE TABLE I).
- B. A SERIAL NUMBER (SEE 3.5 HEREIN).
- C. TERMINAL IDENTIFICATION (SEE FIGURE 1, 2, 3 OR 4).
- D. A FOUR DIGIT LOT DATE CODE (SEE 3.6 HEREIN).
- E. THE MANUFACTURER'S NAME OR SYMBOL AND CAGE CODE.

**3.5 SERIALIZATION.** EACH PART SHALL BE ASSIGNED AN INDIVIDUAL 5-DIGIT (MAXIMUM) NUMERIC OR ALPHANUMERIC SERIAL NUMBER.

SIZE	CAGE CODE	DWG NO	BLW
A	34950	58-P34232W	C
SCALE: NONE		SHEET 5	

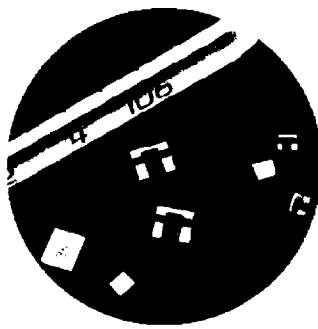
### 3.53 60135650XX, THERMAL PAD TVAXX00X0XW3S, EMC

These temperature compensating attenuators have a solder plate finish over a nickel barrier. A pure tin finish is not prohibited.

Acrobat Reader [thermal pad.pdf]

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Thermopad<sup>®</sup>  
Temperature Compensating Attenuator



**Features and Benefits**

- Power absorption varies with temperature
- Adaptive line to wave attenuator
- Totally passive
- Inexpensive solution to temperature compensation
- Introduces no intermediate components
- Constant input/output impedance vs. temperature

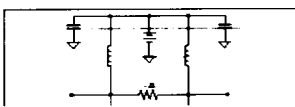
**The EMC Difference:**

Our solderable Thermopads feature solderable, wave-solderable, thru-hole terminations. This termination system provides superior solderability and load resistance. Power compatible with both manual and automated soldering processes, including hot air flow. This system minimizes the need for preheating.

**Application Note: Biased Thermopads**

The Thermopad is a passive temperature compensating attenuator that changes value with changes in ambient temperature, or input power. Thermopads are commonly cascaded with amplifiers, filters, delay lines, and other signal processing devices to reduce the variation in the amplitude

can be accomplished by applying DC bias to the Thermopad. The schematics in Figure 1 show a DC biased attenuator that



125% 24 1 of 4 65 x 11 in

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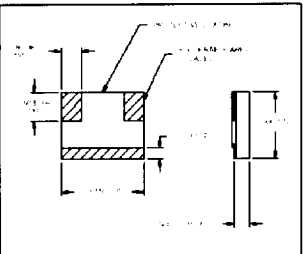
Thermal Pad Header (Thermal pad.pdf)

File Edit Document View Window Help

PO1: +0.005 T T T  
 PO2: +0.007 T T T  
 PO3: +0.008 T T  
 PO4: +0.009 T T

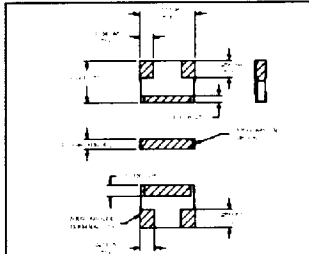
The configurations most popular with designers are indicated in bold.  
 \*TCA: Temperature Coefficient of Attenuation

MTVA



Average Power: 0.2 W  
 Frequency Range: DC - 18 GHz

MTVAW3



Average Power: 0.2 W  
 Frequency Range: DC - 12 GHz

**Metallization Options**

**Basic (no code):** Flattened device for flip chip mounting offers the best RF performance and lowest cost.

**Triple Wrap (W3):** Metallization wraps around three of the pads. Allows inspection of solder joints when flip chip mounting.

**Single Wrap (W1):** Metallization wraps around ground terminal only. Full backside metallization.

**Gold (G):** Flattened device with gold metallization. MTVA only. Typically used for wire bonding.

**Pre-tinned (S):** Pre-tinning improves solderability.

**TVA-EE-Kit**

Included in the kit are three each of: TVA0100N08, TVA0300N07, TVA0300N07W3, and TVA0600N07.

Also included is the Thermopad Selection Software Tool.

LMC Technology Inc.

125K 4 of 4 0.5 x 11 in

Start Novel... Inbox... Micros... Explor... Micros... Micros... Netcom... Acro...

12:31 PM

### 3.54 60136450xx; Attenuator TS03xxW3S

A pure tin finish is not prohibited and the finish is not specified.

### 3.55 DMG-2BXXXXX; MIXER, MERRIMAC

A pure tin finish is not prohibited and the finish is not specified.

3.57 SPD3510-90, M/A-COM

DPA report 11702-005 shows the package and gold leads gold plated.

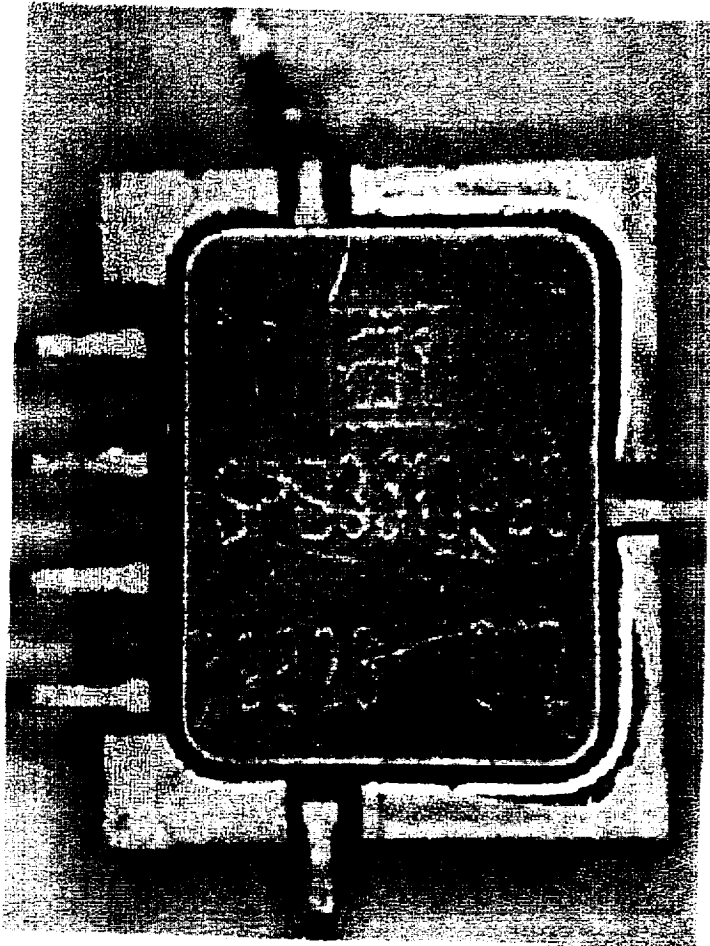


FIGURE NO:	12
SAMPLE NO:	012
MAG:	28x
SUBJECT:	

OVERALL OF PART SHOWING  
MARKING.

PHOTOGRAPH

## 3.57 SR8800SPQXXXBY; COAXIAL RESONATOR

The following manufacture's data sheet specifies the finish as silver, but does not prohibit the use of pure tin as a finish.

06/19/98 09:43 802 441 5906

SX

00:

## Coaxial Resonators

SR8800

## Dimensions and Configurations

The Trans-Tech resonator components are available over a frequency use range of 215 to 5760MHz. Three mechanical profiles are offered to give the designer the greatest flexibility in selecting the electrical quality factor (Q). The high profile (HP) component has the highest Q but also has the largest size which may require special mounting considerations. The standard profile (SP) offers a compromise of electrical Q and mechanical size, and should be considered the component of choice for most applications. Where space is critical, the low profile (LP) component should be considered, but at the expense of some reduction in electrical Q.

These components are available in square configurations with outside dimensions of approximately .477" (12mm), .238" (6mm), and .156" (4mm). Length ( $l$ ) controls the operating frequency. Thick-film silver metallization is applied to form a Type Q ( $\lambda/4$ ) or a Type H ( $\lambda/2$ ) resonator. A Type Q resonator has all surfaces metallized except one end. For Type H resonators, surfaces are metallized except for both ends.

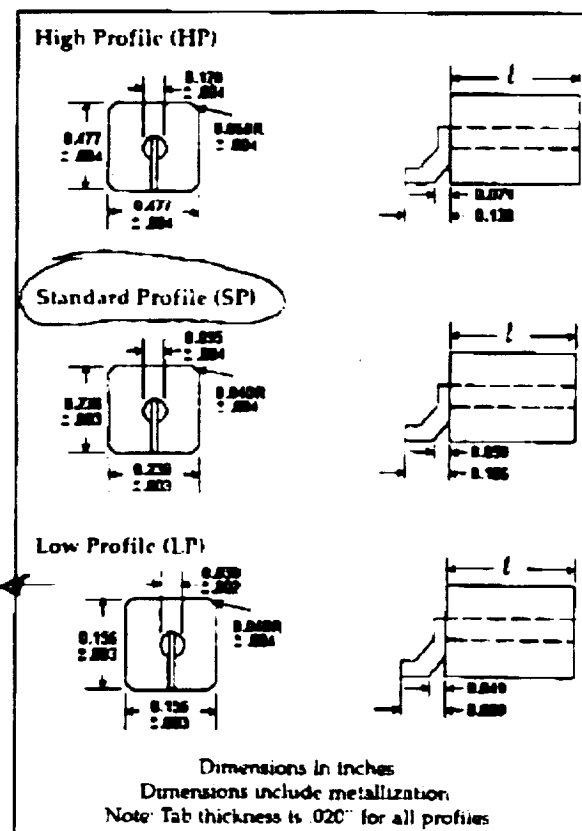


Figure 1 Mechanical Configuration of Resonator Components

03 12 96 09 42

NO: 441 8906

SR

Q 001

To: Rm Zellitt 1-8500 (5) pages

**Coaxial Resonators****Standard Specifications**

The various profiles, materials and types available for the Trans Tech coaxial TEM mode resonators are summarized in Figure 4. You have a choice of two types, two materials and three profiles. This range of component variables should meet most circuit design requirements. While the component is manufactured to frequency, a formula is given so that the approximate length can be determined.

Type	Material	Nominal Length Formula (Inches) $\pm .001$	Recommended Range $f_r$ (MHz)
Q (A/4) Quarter wavelength	8800	$l = \frac{475}{f_r \text{ (MHz)}}$	HP 260 to 1700 SP 360 to 2400 LP 600 to 2880
H (A/2) Half wavelength	8800	$l = \frac{951}{f_r \text{ (MHz)}}$	HP 550 to 2280 SP 1100 to 4800 LP 1320 to 5760
Q (A/4) Quarter wavelength	9000	$l = \frac{319}{f_r \text{ (MHz)}}$	HP 170 to 780 SP 230 to 1560 LP 440 to 2880
H (A/2) Half wavelength	9000	$l = \frac{638}{f_r \text{ (MHz)}}$	HP 360 to 1440 SP 715 to 2760 LP 850 to 5760

Figure 4 Selection Chart

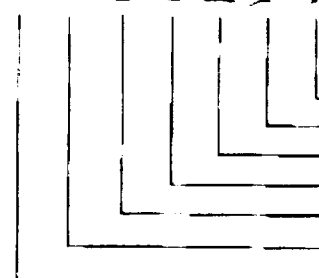
The selected resonant frequency is available with two standard frequency tolerances of  $\pm 0.5\%$  and  $\pm 1.0\%$ . The minimum tolerance is  $\pm 2\text{MHz}$ .

Please note that your ordered value of  $l$  will be set according to our measurement procedure (see page 6). The  $l$  in your circuit may vary due to stray reactance. This effect can be corrected by changing your ordered value of  $l$ .

**Coaxial Resonator Ordering Information**

Example

SR 8800 SP Q 1300 A Y



Tab: Y = Yes, N = No

Frequency Tolerance: A =  $\pm 0.5\%$ , B =  $\pm 1.0\%$ 

Resonant Frequency stated in MHz (see fig. 4)

Type: Q for A/4, H for A/2

Profile: LP (SP) HT (see fig. 1)

Material: 8800 or 9000

Product Code: SR square coaxial resonator

Note: See Solderability (page 7)

## Appendix A

# TDRSS IV EEE Parts Summary by Assembly

PTI CD	PART NUMBER	Part Type	PART VALUE	Make - Buy	Qty/ Assy	Assy
6	06-P34234W002	THERMISTOR, NTC	300 OHMS	BUY	1	TCXO PWB ASSEMBLY
6	06-P34234W004	THERMISTOR, NTC	100K OHMS	BUY	1	TCXO PWB ASSEMBLY
6	311P18-01T7R6	THERMISTOR	2252 OHMS	BUY	1	POWER AMPLIFIER ASSEMBLY
6	311P18-01T7R6	THERMISTOR	2252 OHMS	BUY	1	RECEIVER RF MODULE ASSY
6	311P18-07T7R6	THERMISTOR, NTC	10K OHMS	BUY	1	TCXO PWB ASSEMBLY
6	D55342K07B100D R	RESISTOR	100-1-250MW	BUY	4	DIGITAL PROCESSOR
6	D55342K07B100D R	RESISTOR	100-1-250MW	BUY	1	UPCONVERTER ASSEMBLY
6	D55342K07B102D R	RESISTOR	102-1-250MW	BUY	1	UPCONVERTER ASSEMBLY
6	D55342K07B107D R	RESISTOR, FILM	107-1-250MW	BUY	1	UPCONVERTER ASSEMBLY
6	D55342K07B15D0 R	RESISTOR	15.0-1-250MW	BUY	1	TRANSMITTER POWER CONV.
6	D55342K07B162D R	RESISTOR	162-1-250MW	BUY	2	POWER AMPLIFIER ASSEMBLY
6	D55342K07B1E62 R	RESISTOR	1620-1-250MW	BUY	1	POWER AMPLIFIER ASSEMBLY
6	D55342K07B221D R	RESISTOR	221-1-250MW	BUY	1	UPCONVERTER ASSEMBLY
6	D55342K07B27D4 R	RESISTOR	27.4-1-250MW	BUY	1	DIGITAL PROCESSOR
6	D55342K07B2E00 R	RESISTOR, FIXED, FILM, CHIP	2000-1-0.250	BUY	2	RECEIVER POWER CONVERTER
6	D55342K07B2E00 R	RESISTOR, FIXED, FILM, CHIP	2000-1-0.250	BUY	2	TRANSMITTER POWER CONV.
6	D55342K07B51D1 R	RESISTOR	51.1-1-250MW	BUY	3	DIGITAL PROCESSOR
6	D55342K07B51D1 R	RESISTOR	51.1-1-250MW	BUY	1	RECEIVER POWER CONVERTER
6	D55342K07B5E62 R	RESISTOR	5620-1-250MW	BUY	2	RECEIVER POWER CONVERTER
6	D55342K07B619D R	RESISTOR	619-1-250MW	BUY	1	POWER AMPLIFIER ASSEMBLY
6	D55342K07B68D1 R	RESISTOR	68.1-1-250MW	BUY	8	DIGITAL PROCESSOR
6	D55342K07B750D R	RESISTOR	750-1-250MW	BUY	1	TRANSMITTER POWER CONV.
6	D55342K07B78D7 R	RESISTOR	78.7-1-250MW	BUY	1	UPCONVERTER ASSEMBLY
6	D55342K07B82D5 R	RESISTOR	82.5-1-250MW	BUY	1	UPCONVERTER ASSEMBLY
6	D55342K07B86D6 R	RESISTOR	86.6-1-250MW	BUY	1	UPCONVERTER ASSEMBLY
6	D55342K07B88D7 R	RESISTOR	88.7-1-250MW	BUY	1	UPCONVERTER ASSEMBLY
6	D55342K07B90D9 R	RESISTOR	90.9-1-250MW	BUY	1	UPCONVERTER ASSEMBLY



PTI CD	PART NUMBER	Part Type	PART VALUE	Make - Buy	Qty/ Assy	Assy
6	D55342K07B93D1 R	RESISTOR	93.1-1-250MW	BUY	1	UPCONVERTER ASSEMBLY
6	D55342K07B95D3 R	RESISTOR	95.3-1-250MW	BUY	1	UPCONVERTER ASSEMBLY
6	M39015/3-009PM	RESISTOR	5000	BUY	1	RECEIVER RF MODULE ASSY
6	M55342H06B100D R	RESISTOR, FIXED, FILM, CHIP	100-1-50MW	BUY	6	TCXO PWB ASSEMBLY
6	M55342H06B10E0 R	RESISTOR	10K-1-50MW	BUY	9	TCXO PWB ASSEMBLY
6	M55342H06B11E5 R	RESISTOR	11.5K-1-50MW	BUY	4	TCXO PWB ASSEMBLY
6	M55342H06B127D R	RESISTOR	127-1-50MW	BUY	4	TCXO PWB ASSEMBLY
6	M55342H06B14E3 R	RESISTOR	14.3K-1-50MW	BUY	4	TCXO PWB ASSEMBLY
6	M55342H06B150D R	RESISTOR	150-1-50MW	BUY	4	TCXO PWB ASSEMBLY
6	M55342H06B17E4 R	RESISTOR	17.4K-1-50MW	BUY	4	TCXO PWB ASSEMBLY
6	M55342H06B182D R	RESISTOR	182-1-50MW	BUY	4	TCXO PWB ASSEMBLY
6	M55342H06B1E00 R	RESISTOR	1000-1-50MW	BUY	4	TCXO PWB ASSEMBLY
6	M55342H06B1E21 R	RESISTOR	1210-1-50MW	BUY	5	TCXO PWB ASSEMBLY
6	M55342H06B1E43 R	RESISTOR	1430-1-50MW	BUY	5	TCXO PWB ASSEMBLY
6	M55342H06B1E62 R	RESISTOR, FIXED, FILM, CHIP	1620-1-50MW	BUY	5	TCXO PWB ASSEMBLY
6	M55342H06B1E82 R	RESISTOR, FIXED, FILM, CHIP	1820-1-50MW	BUY	5	TCXO PWB ASSEMBLY
6	M55342H06B200D R	RESISTOR	200-1-50MW	BUY	8	TCXO PWB ASSEMBLY
6	M55342H06B20E5 R	RESISTOR, FIXED, FILM, CHIP	20.5K-1-50MW	BUY	4	TCXO PWB ASSEMBLY
6	M55342H06B22E1 R	RESISTOR, FIXED, FILM, CHIP	22.1K-1-50MW	BUY	1	TCXO PWB ASSEMBLY
6	M55342H06B23E7 R	RESISTOR	23.7K-1-50MW	BUY	4	TCXO PWB ASSEMBLY
6	M55342H06B24D3 R	RESISTOR	24.3-1-50MW	BUY	5	TCXO PWB ASSEMBLY
6	M55342H06B26E7 R	RESISTOR	26.7K-1-50MW	BUY	4	TCXO PWB ASSEMBLY
6	M55342H06B29E4 R	RESISTOR	29.4K-1-50MW	BUY	4	TCXO PWB ASSEMBLY
6	M55342H06B2E00 R	RESISTOR	2000-1-50MW	BUY	5	TCXO PWB ASSEMBLY
6	M55342H06B2E21 R	RESISTOR	2210-1-50MW	BUY	4	TCXO PWB ASSEMBLY
6	M55342H06B2E43 R	RESISTOR	2430-1-50MW	BUY	7	TCXO PWB ASSEMBLY
6	M55342H06B2E61 R	RESISTOR	2610-1-50MW	BUY	7	TCXO PWB ASSEMBLY
6	M55342H06B2E80 R	RESISTOR, FIXED, FILM, CHIP	2800-1-50MW	BUY	8	TCXO PWB ASSEMBLY
6	M55342H06B32E4 R	RESISTOR	32.4K-1-50MW	BUY	3	TCXO PWB ASSEMBLY
6	M55342H06B392D R	RESISTOR	392-1-50MW	BUY	8	TCXO PWB ASSEMBLY

PTI CD	PART NUMBER	Part Type	PART VALUE	Make - Buy	Qty/ Assy	Assy
6	M55342H06B3E57 R	RESISTOR	3570-1-50MW	BUY	1	TCXO PWB ASSEMBLY
6	M55342H06B49D9 R	RESISTOR, FIXED, FILM, CHIP	49.9-1-50MW	BUY	6	TCXO PWB ASSEMBLY
6	M55342H06B511D R	RESISTOR, FIXED, FILM, CHIP	511-1-50MW	BUY	2	TCXO PWB ASSEMBLY
6	M55342H06B5E11 R	RESISTOR	5110-1-50MW	BUY	1	TCXO PWB ASSEMBLY
6	M55342H06B5E62 R	RESISTOR, FIXED, FILM, CHIP	5620-1-50MW	BUY	5	TCXO PWB ASSEMBLY
6	M55342H06B5E90 R	RESISTOR	5900-1-50MW	BUY	1	TCXO PWB ASSEMBLY
6	M55342H06B604D R	RESISTOR	604-1-50MW	BUY	4	TCXO PWB ASSEMBLY
6	M55342H06B68D1 R	RESISTOR	68.1-1-50MW	BUY	5	TCXO PWB ASSEMBLY
6	M55342H06B6E81 R	RESISTOR, FIXED, FILM, CHIP	6810-1-50MW	BUY	3	TCXO PWB ASSEMBLY
6	M55342H06B750D R	RESISTOR, FIXED, FILM, CHIP	750-1-50MW	BUY	2	TCXO PWB ASSEMBLY
6	M55342H06B7E50 R	RESISTOR, FIXED, FILM, CHIP	7500-1-50MW	BUY	3	TCXO PWB ASSEMBLY
6	M55342H06B825D R	RESISTOR	825-1-50MW	BUY	4	TCXO PWB ASSEMBLY
6	M55342H06B8E45 R	RESISTOR	8450-1-50MW	BUY	6	TCXO PWB ASSEMBLY
6	M55342K06B100D R	RESISTOR, FIXED, FILM, CHIP	100-1-100MW	BUY	1	DIGITAL PROCESSOR
6	M55342K06B100D R	RESISTOR, FIXED, FILM, CHIP	100-1-100MW	BUY	1	POWER AMPLIFIER ASSEMBLY
6	M55342K06B100D R	RESISTOR, FIXED, FILM, CHIP	100-1-100MW	BUY	1	RECEIVER POWER CONVERTER
6	M55342K06B100D R	RESISTOR, FIXED, FILM, CHIP	100-1-100MW	BUY	3	RECEIVER RF MODULE ASSY
6	M55342K06B100D R	RESISTOR, FIXED, FILM, CHIP	100-1-100MW	BUY	2	TCXO PWB ASSEMBLY
6	M55342K06B100D R	RESISTOR, FIXED, FILM, CHIP	100-1-100MW	BUY	1	TRANSMITTER POWER CONV.
6	M55342K06B100D R	RESISTOR, FIXED, FILM, CHIP	100-1-100MW	BUY	1	UPCONVERTER ASSEMBLY
6	M55342K06B100E R	RESISTOR, FIXED, FILM, CHIP	100K-1-100MW	BUY	12	POWER AMPLIFIER ASSEMBLY
6	M55342K06B100E R	RESISTOR, FIXED, FILM, CHIP	100K-1-100MW	BUY	3	RECEIVER RF MODULE ASSY
6	M55342K06B100E R	RESISTOR, FIXED, FILM, CHIP	100K-1-100MW	BUY	4	TRANSMITTER POWER CONV.
6	M55342K06B105D R	RESISTOR	105-1-100MW	BUY	8	UPCONVERTER ASSEMBLY
6	M55342K06B10D0 R	RESISTOR, FIXED, FILM, CHIP	10-1-100MW	BUY	1	POWER AMPLIFIER ASSEMBLY
6	M55342K06B10D0 R	RESISTOR, FIXED, FILM, CHIP	10-1-100MW	BUY	7	RECEIVER RF MODULE ASSY
6	M55342K06B10D0 R	RESISTOR, FIXED, FILM, CHIP	10-1-100MW	BUY	1	TRANSMITTER POWER CONV.
6	M55342K06B10D0 R	RESISTOR, FIXED, FILM, CHIP	10-1-100MW	BUY	16	UPCONVERTER ASSEMBLY
6	M55342K06B10E0 R	RESISTOR, FIXED, FILM, CHIP	10K-1-100MW	BUY	7	DIGITAL PROCESSOR
6	M55342K06B10E0 R	RESISTOR, FIXED, FILM, CHIP	10K-1-100MW	BUY	4	POWER AMPLIFIER ASSEMBLY

PTI CD	PART NUMBER	Part Type	PART VALUE	Make - Buy	Qty/ Assy	Assy
6	M55342K06B10E0 R	RESISTOR, FIXED, FILM, CHIP	10K-1-100MW	BUY	7	RECEIVER POWER CONVERTER
6	M55342K06B10E0 R	RESISTOR, FIXED, FILM, CHIP	10K-1-100MW	BUY	16	RECEIVER RF MODULE ASSY
6	M55342K06B10E0 R	RESISTOR, FIXED, FILM, CHIP	10K-1-100MW	BUY	11	TRANSMITTER POWER CONV.
6	M55342K06B10E0 R	RESISTOR, FIXED, FILM, CHIP	10K-1-100MW	BUY	3	UPCONVERTER ASSEMBLY
6	M55342K06B110E R	RESISTOR	110K-1-100MW	BUY	2	POWER AMPLIFIER ASSEMBLY
6	M55342K06B11D3 R	RESISTOR	11.3-1-100MW	BUY	17	UPCONVERTER ASSEMBLY
6	M55342K06B11E0 R	RESISTOR	11K-1-100MW	BUY	4	RECEIVER RF MODULE ASSY
6	M55342K06B121D R	RESISTOR, FIXED, FILM, CHIP	121-1-100MW	BUY	7	DIGITAL PROCESSOR
6	M55342K06B121D R	RESISTOR, FIXED, FILM, CHIP	121-1-100MW	BUY	6	UPCONVERTER ASSEMBLY
6	M55342K06B121E R	RESISTOR	121K-1-100MW	BUY	2	POWER AMPLIFIER ASSEMBLY
6	M55342K06B12D4 R	RESISTOR	12.4-1-100	BUY	12	UPCONVERTER ASSEMBLY
6	M55342K06B12E1 R	RESISTOR	12.1K-1-100MW	BUY	2	RECEIVER RF MODULE ASSY
6	M55342K06B12E4 R	RESISTOR	12.4K-1-100MW	BUY	1	RECEIVER POWER CONVERTER
6	M55342K06B12E4 R	RESISTOR	12.4K-1-100MW	BUY	1	TRANSMITTER POWER CONV.
6	M55342K06B12E4 R	RESISTOR	12.4K-1-100MW	BUY	1	UPCONVERTER ASSEMBLY
6	M55342K06B130D R	RESISTOR	130-1-100MW	BUY	2	DIGITAL PROCESSOR
6	M55342K06B130E R	RESISTOR	130K-1-100MW	BUY	2	POWER AMPLIFIER ASSEMBLY
6	M55342K06B13E0 R	RESISTOR	13K-1-100MW	BUY	2	RECEIVER RF MODULE ASSY
6	M55342K06B14D0 R	RESISTOR	14-1-100MW	BUY	16	UPCONVERTER ASSEMBLY
6	M55342K06B14D1 R	RESISTOR	14.1-1-100MW	BUY	6	UPCONVERTER ASSEMBLY
6	M55342K06B14E0 R	RESISTOR	14K-1-100MW	BUY	1	RECEIVER RF MODULE ASSY
6	M55342K06B150D R	RESISTOR, FIXED, FILM, CHIP	150-1-100MW	BUY	8	UPCONVERTER ASSEMBLY
6	M55342K06B150E R	RESISTOR, FIXED, FILM, CHIP	150K-1-100MW	BUY	1	DIGITAL PROCESSOR
6	M55342K06B150E R	RESISTOR, FIXED, FILM, CHIP	150K-1-100MW	BUY	2	POWER AMPLIFIER ASSEMBLY
6	M55342K06B150E R	RESISTOR, FIXED, FILM, CHIP	150K-1-100MW	BUY	1	RECEIVER RF MODULE ASSY
6	M55342K06B15D0 R	RESISTOR, FIXED, FILM, CHIP	15-1-100MW	BUY	1	RECEIVER POWER CONVERTER
6	M55342K06B15D4 R	RESISTOR	15.4-1-100	BUY	8	UPCONVERTER ASSEMBLY
6	M55342K06B15E0 R	RESISTOR, FIXED, FILM, CHIP	15K-1-100MW	BUY	1	RECEIVER RF MODULE ASSY
6	M55342K06B162D R	RESISTOR	162-1-100MW	BUY	1	RECEIVER RF MODULE ASSY
6	M55342K06B162D R	RESISTOR	162-1-100MW	BUY	1	TCXO PWB ASSEMBLY

PTI CD	PART NUMBER	Part Type	PART VALUE	Make - Buy	Qty/ Assy	Assy
6	M55342K06B162E R	RESISTOR	162K-1-100MW	BUY	2	POWER AMPLIFIER ASSEMBLY
6	M55342K06B16D2 R	RESISTOR	16.2-1-100MW	BUY	2	POWER AMPLIFIER ASSEMBLY
6	M55342K06B16D2 R	RESISTOR	16.2-1-100MW	BUY	1	RECEIVER POWER CONVERTER
6	M55342K06B16D2 R	RESISTOR	16.2-1-100MW	BUY	3	RECEIVER RF MODULE ASSY
6	M55342K06B16D2 R	RESISTOR	16.2-1-100MW	BUY	3	TRANSMITTER POWER CONV.
6	M55342K06B16D5 R	RESISTOR	16.5-1-100	BUY	3	UPCONVERTER ASSEMBLY
6	M55342K06B16E2 R	RESISTOR	16.2K-1-100MW	BUY	12	UPCONVERTER ASSEMBLY
6	M55342K06B16E9 R	RESISTOR	16.9K-1-100MW	BUY	1	RECEIVER RF MODULE ASSY
6	M55342K06B182E R	RESISTOR	182K-1-100MW	BUY	1	RECEIVER RF MODULE ASSY
6	M55342K06B18D2 R	RESISTOR	18.2-1-100MW	BUY	2	POWER AMPLIFIER ASSEMBLY
6	M55342K06B18E2 R	RESISTOR	18.2K-1-100MW	BUY	1	UPCONVERTER ASSEMBLY
6	M55342K06B19E1 R	RESISTOR	19.1K-1-100MW	BUY	3	RECEIVER RF MODULE ASSY
6	M55342K06B1E00 R	RESISTOR, FIXED, FILM, CHIP	1000-1-100MW	BUY	1	RECEIVER RF MODULE ASSY
6	M55342K06B1E00 R	RESISTOR, FIXED, FILM, CHIP	1000-1-100MW	BUY	1	POWER AMPLIFIER ASSEMBLY
6	M55342K06B1E00 R	RESISTOR, FIXED, FILM, CHIP	1000-1-100MW	BUY	2	RECEIVER POWER CONVERTER
6	M55342K06B1E00 R	RESISTOR, FIXED, FILM, CHIP	1000-1-100MW	BUY	5	RECEIVER RF MODULE ASSY
6	M55342K06B1E00 R	RESISTOR, FIXED, FILM, CHIP	1000-1-100MW	BUY	2	TCXO PWB ASSEMBLY
6	M55342K06B1E00 R	RESISTOR, FIXED, FILM, CHIP	1000-1-100MW	BUY	4	TRANSMITTER POWER CONV.
6	M55342K06B1E00 R	RESISTOR, FIXED, FILM, CHIP	1000-1-100MW	BUY	2	UPCONVERTER ASSEMBLY
6	M55342K06B1E10 R	RESISTOR	1100-1-100MW	BUY	2	RECEIVER RF MODULE ASSY
6	M55342K06B1E21 R	RESISTOR	1210-1-100MW	BUY	1	RECEIVER RF MODULE ASSY
6	M55342K06B1E30 R	RESISTOR	1300-1-100MW	BUY	1	RECEIVER RF MODULE ASSY
6	M55342K06B1E50 R	RESISTOR, FIXED, FILM, CHIP	1500-1-100MW	BUY	1	RECEIVER RF MODULE ASSY
6	M55342K06B1E50 R	RESISTOR, FIXED, FILM, CHIP	1500-1-100MW	BUY	2	RECEIVER POWER CONVERTER
6	M55342K06B1E50 R	RESISTOR, FIXED, FILM, CHIP	1500-1-100MW	BUY	2	RECEIVER RF MODULE ASSY
6	M55342K06B1E50 R	RESISTOR, FIXED, FILM, CHIP	1500-1-100MW	BUY	2	TRANSMITTER POWER CONV.
6	M55342K06B1E62 R	RESISTOR	1620-1-100MW	BUY	1	RECEIVER RF MODULE ASSY
6	M55342K06B1E82 R	RESISTOR	1820-1-100MW	BUY	2	RECEIVER RF MODULE ASSY
6	M55342K06B1E91 R	RESISTOR	1910-1-.100	BUY	1	DIGITAL PROCESSOR
6	M55342K06B1F00 R	RESISTOR	1M-1-100MW	BUY	1	RECEIVER RF MODULE ASSY
6	M55342K06B200D R	RESISTOR, FIXED, FILM, CHIP	200-1-.1	BUY	1	RECEIVER RF MODULE ASSY

PTI CD	PART NUMBER	Part Type	PART VALUE	Make - Buy	Qty/ Assy	Assy
6	M55342K06B200E R	RESISTOR, FIXED, FILM, CHIP	200K-1-100MW	BUY	2	POWER AMPLIFIER ASSEMBLY
6	M55342K06B20D0 R	RESISTOR, FIXED, FILM, CHIP	20-1-100MW	BUY	7	RECEIVER RF MODULE ASSY
6	M55342K06B20D0 R	RESISTOR, FIXED, FILM, CHIP	20-1-100MW	BUY	6	UPCONVERTER ASSEMBLY
6	M55342K06B20E0 R	RESISTOR, FIXED, FILM, CHIP	20K-1-100MW	BUY	1	RECEIVER POWER CONVERTER
6	M55342K06B20E0 R	RESISTOR, FIXED, FILM, CHIP	20K-1-100MW	BUY	2	RECEIVER RF MODULE ASSY
6	M55342K06B20E0 R	RESISTOR, FIXED, FILM, CHIP	20K-1-100MW	BUY	2	TRANSMITTER POWER CONV.
6	M55342K06B210D R	RESISTOR	210-1-100MW	BUY	3	DIGITAL PROCESSOR
6	M55342K06B210D R	RESISTOR	210-1-100MW	BUY	8	UPCONVERTER ASSEMBLY
6	M55342K06B21E5 R	RESISTOR	21.5K-1-100MW	BUY	1	TRANSMITTER POWER CONV.
6	M55342K06B221D R	RESISTOR	221-1-100MW	BUY	9	RECEIVER RF MODULE ASSY
6	M55342K06B221D R	RESISTOR	221-1-100MW	BUY	2	TCXO PWB ASSEMBLY
6	M55342K06B221D R	RESISTOR	221-1-100MW	BUY	3	UPCONVERTER ASSEMBLY
6	M55342K06B221E R	RESISTOR	221K-1-100MW	BUY	2	POWER AMPLIFIER ASSEMBLY
6	M55342K06B22D1 R	RESISTOR	22.1-1-100MW	BUY	2	POWER AMPLIFIER ASSEMBLY
6	M55342K06B22D1 R	RESISTOR	22.1-1-100MW	BUY	6	UPCONVERTER ASSEMBLY
6	M55342K06B22E1 R	RESISTOR	22.1K-1-100MW	BUY	1	RECEIVER POWER CONVERTER
6	M55342K06B22E1 R	RESISTOR	22.1K-1-100MW	BUY	3	RECEIVER RF MODULE ASSY
6	M55342K06B22E1 R	RESISTOR	22.1K-1-100MW	BUY	2	TRANSMITTER POWER CONV.
6	M55342K06B22E6 R	RESISTOR	22.6K-1-100MW	BUY	1	TRANSMITTER POWER CONV.
6	M55342K06B23E7 R	RESISTOR	23.7K-1-100MW	BUY	1	TRANSMITTER POWER CONV.
6	M55342K06B243D R	RESISTOR	243-1-100MW	BUY	1	RECEIVER RF MODULE ASSY
6	M55342K06B243E R	RESISTOR	243K-1-100MW	BUY	2	POWER AMPLIFIER ASSEMBLY
6	M55342K06B243E R	RESISTOR	243K-1-100MW	BUY	1	RECEIVER RF MODULE ASSY
6	M55342K06B24D3 R	RESISTOR	24.3-1-100MW	BUY	4	RECEIVER RF MODULE ASSY
6	M55342K06B24D3 R	RESISTOR	24.3-1-100MW	BUY	2	TCXO PWB ASSEMBLY
6	M55342K06B24D3 R	RESISTOR	24.3-1-100MW	BUY	2	UPCONVERTER ASSEMBLY
6	M55342K06B24E3 R	RESISTOR	24.3K-1-100MW	BUY	1	POWER AMPLIFIER ASSEMBLY
6	M55342K06B24E9 R	RESISTOR	24.9K-1-100MW	BUY	1	TRANSMITTER POWER CONV.
6	M55342K06B25E5 R	RESISTOR, FILM	25.5K-1-100MW	BUY	1	RECEIVER POWER CONVERTER
6	M55342K06B26E1 R	RESISTOR	26.1K-1-100MW	BUY	1	TRANSMITTER POWER CONV.

Wednesday, July 26, 2000

PTI CD	PART NUMBER	Part Type	PART VALUE	Make - Buy	Qty/ Assy	Assy
6	M55342K06B26E7 R	RESISTOR	26.7K-1-100MW	BUY	1	RECEIVER POWER CONVERTER
6	M55342K06B274D R	RESISTOR, FIXED, FILM, CHIP	274-1-100MW	BUY	1	RECEIVER RF MODULE ASSY
6	M55342K06B274E R	RESISTOR	274K-1-100MW	BUY	2	POWER AMPLIFIER ASSEMBLY
6	M55342K06B27D4 R	RESISTOR	27.4-1-100MW	BUY	2	RECEIVER POWER CONVERTER
6	M55342K06B27D4 R	RESISTOR	27.4-1-100MW	BUY	2	TRANSMITTER POWER CONV.
6	M55342K06B27D4 R	RESISTOR	27.4-1-100MW	BUY	1	UPCONVERTER ASSEMBLY
6	M55342K06B27E4 R	RESISTOR	27.4K-1-100MW	BUY	1	RECEIVER POWER CONVERTER
6	M55342K06B27E4 R	RESISTOR	27.4K-1-100MW	BUY	1	TRANSMITTER POWER CONV.
6	M55342K06B27E4 R	RESISTOR	27.4K-1-100MW	BUY	1	UPCONVERTER ASSEMBLY
6	M55342K06B280D R	RESISTOR	280-1-100MW	BUY	1	TCXO PWB ASSEMBLY
6	M55342K06B28E0 R	RESISTOR	28.0K-1-100MW	BUY	1	RECEIVER POWER CONVERTER
6	M55342K06B28E7 R	RESISTOR	28.7K-1-100MW	BUY	1	RECEIVER POWER CONVERTER
6	M55342K06B2E00 R	RESISTOR, FIXED, FILM, CHIP	2000-1-100MW	BUY	1	POWER AMPLIFIER ASSEMBLY
6	M55342K06B2E00 R	RESISTOR, FIXED, FILM, CHIP	2000-1-100MW	BUY	2	RECEIVER POWER CONVERTER
6	M55342K06B2E00 R	RESISTOR, FIXED, FILM, CHIP	2000-1-100MW	BUY	3	RECEIVER RF MODULE ASSY
6	M55342K06B2E00 R	RESISTOR, FIXED, FILM, CHIP	2000-1-100MW	BUY	2	TRANSMITTER POWER CONV.
6	M55342K06B2E21 R	RESISTOR	2210-1-100MW	BUY	4	RECEIVER RF MODULE ASSY
6	M55342K06B2E43 R	RESISTOR	2430-1-100MW	BUY	1	RECEIVER RF MODULE ASSY
6	M55342K06B2E43 R	RESISTOR	2430-1-100MW	BUY	1	UPCONVERTER ASSEMBLY
6	M55342K06B2E74 R	RESISTOR	2740-1-100MW	BUY	1	RECEIVER RF MODULE ASSY
6	M55342K06B301D R	RESISTOR, FIXED, FILM, CHIP	301-1-100MW	BUY	1	RECEIVER RF MODULE ASSY
6	M55342K06B301E R	RESISTOR, FIXED, FILM, CHIP	301K-1-100MW	BUY	2	POWER AMPLIFIER ASSEMBLY
6	M55342K06B301E R	RESISTOR, FIXED, FILM, CHIP	301K-1-100MW	BUY	1	RECEIVER RF MODULE ASSY
6	M55342K06B301E R	RESISTOR, FIXED, FILM, CHIP	301K-1-100MW	BUY	1	TRANSMITTER POWER CONV.
6	M55342K06B30D1 R	RESISTOR, FIXED, FILM, CHIP	30.1-1-100MW	BUY	1	RECEIVER RF MODULE ASSY
6	M55342K06B30D1 R	RESISTOR, FIXED, FILM, CHIP	30.1-1-100MW	BUY	1	UPCONVERTER ASSEMBLY
6	M55342K06B30E1 R	RESISTOR, FIXED, FILM, CHIP	30.1K-1-100MW	BUY	2	RECEIVER RF MODULE ASSY
6	M55342K06B30E1 R	RESISTOR, FIXED, FILM, CHIP	30.1K-1-100MW	BUY	2	UPCONVERTER ASSEMBLY
6	M55342K06B332D R	RESISTOR, FIXED, FILM, CHIP	332-1-100MW	BUY	1	POWER AMPLIFIER ASSEMBLY
6	M55342K06B332D R	RESISTOR, FIXED, FILM, CHIP	332-1-100MW	BUY	3	RECEIVER RF MODULE ASSY

PTI CD	PART NUMBER	Part Type	PART VALUE	Make - Buy	Qty/ Assy	Assy
6	M55342K06B332E R	RESISTOR	332K-1-100MW	BUY	3	POWER AMPLIFIER ASSEMBLY
6	M55342K06B33D2 R	RESISTOR	33.2-1-100MW	BUY	2	RECEIVER RF MODULE ASSY
6	M55342K06B33D2 R	RESISTOR	33.2-1-100MW	BUY	2	UPCONVERTER ASSEMBLY
6	M55342K06B33E2 R	RESISTOR	33.2K-1-100MW	BUY	2	POWER AMPLIFIER ASSEMBLY
6	M55342K06B33E2 R	RESISTOR	33.2K-1-100MW	BUY	4	RECEIVER RF MODULE ASSY
6	M55342K06B357D R	RESISTOR	357-1-.1	BUY	1	UPCONVERTER ASSEMBLY
6	M55342K06B365D R	RESISTOR	365-1-100MW	BUY	1	RECEIVER RF MODULE ASSY
6	M55342K06B365E R	RESISTOR	365K-1-100MW	BUY	2	POWER AMPLIFIER ASSEMBLY
6	M55342K06B36E5 R	RESISTOR	36.5K-1-100MW	BUY	2	POWER AMPLIFIER ASSEMBLY
6	M55342K06B392D R	RESISTOR	392-1-100MW	BUY	1	RECEIVER RF MODULE ASSY
6	M55342K06B392D R	RESISTOR	392-1-100MW	BUY	1	TCXO PWB ASSEMBLY
6	M55342K06B392E R	RESISTOR	392K-1-100MW	BUY	2	POWER AMPLIFIER ASSEMBLY
6	M55342K06B39D2 R	RESISTOR	39.2-1-100MW	BUY	3	RECEIVER POWER CONVERTER
6	M55342K06B39D2 R	RESISTOR	39.2-1-100MW	BUY	8	RECEIVER RF MODULE ASSY
6	M55342K06B39D2 R	RESISTOR	39.2-1-100MW	BUY	1	TCXO PWB ASSEMBLY
6	M55342K06B39D2 R	RESISTOR	39.2-1-100MW	BUY	4	UPCONVERTER ASSEMBLY
6	M55342K06B39E2 R	RESISTOR	39.2K-1-100MW	BUY	2	POWER AMPLIFIER ASSEMBLY
6	M55342K06B39E2 R	RESISTOR	39.2K-1-100MW	BUY	1	RECEIVER RF MODULE ASSY
6	M55342K06B3E01 R	RESISTOR, FIXED, FILM, CHIP	3010-1-100MW	BUY	2	RECEIVER RF MODULE ASSY
6	M55342K06B3E01 R	RESISTOR, FIXED, FILM, CHIP	3010-1-100MW	BUY	1	TRANSMITTER POWER CONV.
6	M55342K06B3E32 R	RESISTOR	3320-1-100MW	BUY	1	POWER AMPLIFIER ASSEMBLY
6	M55342K06B3E32 R	RESISTOR	3320-1-100MW	BUY	1	RECEIVER RF MODULE ASSY
6	M55342K06B3E57 R	RESISTOR	3570-1-100MW	BUY	2	TCXO PWB ASSEMBLY
6	M55342K06B3E57 R	RESISTOR	3570-1-100MW	BUY	2	UPCONVERTER ASSEMBLY
6	M55342K06B432D R	RESISTOR	432-1-100MW	BUY	1	RECEIVER RF MODULE ASSY
6	M55342K06B432E R	RESISTOR	432K-1-100MW	BUY	2	POWER AMPLIFIER ASSEMBLY
6	M55342K06B43D2 R	RESISTOR	43.2-1-100MW	BUY	1	UPCONVERTER ASSEMBLY
6	M55342K06B43E2 R	RESISTOR	43.2K-1-100MW	BUY	2	POWER AMPLIFIER ASSEMBLY
6	M55342K06B45D3 R	RESISTOR	45.3-1-100MW	BUY	1	UPCONVERTER ASSEMBLY
6	M55342K06B475D R	RESISTOR	475-1-100MW	BUY	1	RECEIVER POWER CONVERTER

PTI CD	PART NUMBER	Part Type	PART VALUE	Make - Buy	Qty/ Assy	Assy
6	M55342K06B475D R	RESISTOR	475-1-100MW	BUY	3	RECEIVER RF MODULE ASSY
6	M55342K06B475D R	RESISTOR	475-1-100MW	BUY	1	TRANSMITTER POWER CONV.
6	M55342K06B475E R	RESISTOR	475K-1-100MW	BUY	2	POWER AMPLIFIER ASSEMBLY
6	M55342K06B475E R	RESISTOR	475K-1-100MW	BUY	2	RECEIVER RF MODULE ASSY
6	M55342K06B475E R	RESISTOR	475K-1-100MW	BUY	1	TRANSMITTER POWER CONV.
6	M55342K06B47D5 R	RESISTOR	47.5-1-100MW	BUY	1	POWER AMPLIFIER ASSEMBLY
6	M55342K06B47D5 R	RESISTOR	47.5-1-100MW	BUY	3	UPCONVERTER ASSEMBLY
6	M55342K06B47E5 R	RESISTOR	47.5K-1-100MW	BUY	2	POWER AMPLIFIER ASSEMBLY
6	M55342K06B47E5 R	RESISTOR	47.5K-1-100MW	BUY	3	RECEIVER RF MODULE ASSY
6	M55342K06B47E5 R	RESISTOR	47.5K-1-100MW	BUY	1	UPCONVERTER ASSEMBLY
6	M55342K06B48D7 R	RESISTOR	48.7-1-100MW	BUY	1	UPCONVERTER ASSEMBLY
6	M55342K06B49D9 R	RESISTOR, FIXED, FILM, CHIP	49.9-1-100MW	BUY	6	RECEIVER RF MODULE ASSY
6	M55342K06B49D9 R	RESISTOR, FIXED, FILM, CHIP	49.9-1-100MW	BUY	2	TCXO PWB ASSEMBLY
6	M55342K06B49E9 R	RESISTOR, FIXED, FILM, CHIP	49.9K-1-100MW	BUY	2	RECEIVER RF MODULE ASSY
6	M55342K06B4E32 R	RESISTOR	4320-1-100MW	BUY	1	RECEIVER RF MODULE ASSY
6	M55342K06B4E64 R	RESISTOR	4640-1-100MW	BUY	2	UPCONVERTER ASSEMBLY
6	M55342K06B4E99 R	RESISTOR, FIXED, FILM, CHIP	4990-1-100MW	BUY	1	RECEIVER RF MODULE ASSY
6	M55342K06B511D R	RESISTOR	511-1-100MW	BUY	1	RECEIVER RF MODULE ASSY
6	M55342K06B51D1 R	RESISTOR	51.1-1-100MW	BUY	2	POWER AMPLIFIER ASSEMBLY
6	M55342K06B51D1 R	RESISTOR	51.1-1-100MW	BUY	3	UPCONVERTER ASSEMBLY
6	M55342K06B51E1 R	RESISTOR	51.1K-1-100MW	BUY	3	POWER AMPLIFIER ASSEMBLY
6	M55342K06B53D6 R	RESISTOR	53.6-1-100MW	BUY	1	UPCONVERTER ASSEMBLY
6	M55342K06B562D R	RESISTOR	562-1-100MW	BUY	1	RECEIVER RF MODULE ASSY
6	M55342K06B56D2 R	RESISTOR	56.2-1-100MW	BUY	2	RECEIVER RF MODULE ASSY
6	M55342K06B56D2 R	RESISTOR	56.2-1-100MW	BUY	4	UPCONVERTER ASSEMBLY
6	M55342K06B56E2 R	RESISTOR	56.2K-1-100MW	BUY	2	POWER AMPLIFIER ASSEMBLY
6	M55342K06B57D6 R	RESISTOR	57.6-1-100MW	BUY	1	UPCONVERTER ASSEMBLY
6	M55342K06B5D62 R	RESISTOR	5.62-1-100MW	BUY	2	RECEIVER POWER CONVERTER
6	M55342K06B5D62 R	RESISTOR	5.62-1-100MW	BUY	8	RECEIVER RF MODULE ASSY
6	M55342K06B5D62 R	RESISTOR	5.62-1-100MW	BUY	3	TRANSMITTER POWER CONV.



PTI CD	PART NUMBER	Part Type	PART VALUE	Make - Buy	Qty/ Assy	Assy
6	M55342K06B5D62 R	RESISTOR	5.62-1-100MW	BUY	16	UPCONVERTER ASSEMBLY
6	M55342K06B5E11 R	RESISTOR	5110-1-100MW	BUY	4	DIGITAL PROCESSOR
6	M55342K06B5E11 R	RESISTOR	5110-1-100MW	BUY	1	POWER AMPLIFIER ASSEMBLY
6	M55342K06B5E11 R	RESISTOR	5110-1-100MW	BUY	1	RECEIVER POWER CONVERTER
6	M55342K06B5E11 R	RESISTOR	5110-1-100MW	BUY	1	RECEIVER RF MODULE ASSY
6	M55342K06B5E11 R	RESISTOR	5110-1-100MW	BUY	1	TRANSMITTER POWER CONV.
6	M55342K06B5E11 R	RESISTOR	5110-1-100MW	BUY	1	UPCONVERTER ASSEMBLY
6	M55342K06B5E62 R	RESISTOR	5620-1-100MW	BUY	1	RECEIVER RF MODULE ASSY
6	M55342K06B5E76 R	RESISTOR	5.76K-1-100MW	BUY	2	TCXO PWB ASSEMBLY
6	M55342K06B5E76 R	RESISTOR	5.76K-1-100MW	BUY	2	UPCONVERTER ASSEMBLY
6	M55342K06B619D R	RESISTOR	619-1-100MW	BUY	1	RECEIVER RF MODULE ASSY
6	M55342K06B61D9 R	RESISTOR	61.9-1-100MW	BUY	2	RECEIVER RF MODULE ASSY
6	M55342K06B61D9 R	RESISTOR	61.9-1-100MW	BUY	1	UPCONVERTER ASSEMBLY
6	M55342K06B61E9 R	RESISTOR	61.9K-1-100MW	BUY	2	POWER AMPLIFIER ASSEMBLY
6	M55342K06B634D R	RESISTOR	634-1-.1	BUY	1	RECEIVER POWER CONVERTER
6	M55342K06B634D R	RESISTOR	634-1-.1	BUY	1	TCXO PWB ASSEMBLY
6	M55342K06B634D R	RESISTOR	634-1-.1	BUY	1	TRANSMITTER POWER CONV.
6	M55342K06B66D5 R	RESISTOR	66.5-1-100MW	BUY	6	UPCONVERTER ASSEMBLY
6	M55342K06B681D R	RESISTOR, FIXED, FILM, CHIP	681-1-.1	BUY	2	RECEIVER POWER CONVERTER
6	M55342K06B681D R	RESISTOR, FIXED, FILM, CHIP	681-1-.1	BUY	1	RECEIVER RF MODULE ASSY
6	M55342K06B681D R	RESISTOR, FIXED, FILM, CHIP	681-1-.1	BUY	2	TRANSMITTER POWER CONV.
6	M55342K06B68D1 R	RESISTOR	68.1-1-100MW	BUY	1	POWER AMPLIFIER ASSEMBLY
6	M55342K06B68D1 R	RESISTOR	68.1-1-100MW	BUY	1	RECEIVER POWER CONVERTER
6	M55342K06B68D1 R	RESISTOR	68.1-1-100MW	BUY	3	RECEIVER RF MODULE ASSY
6	M55342K06B68D1 R	RESISTOR	68.1-1-100MW	BUY	1	TRANSMITTER POWER CONV.
6	M55342K06B68E1 R	RESISTOR	68.1K-1-100MW	BUY	2	POWER AMPLIFIER ASSEMBLY
6	M55342K06B68E1 R	RESISTOR	68.1K-1-100MW	BUY	1	RECEIVER RF MODULE ASSY
6	M55342K06B6D81 R	RESISTOR	6.81-1-100MW	BUY	2	TRANSMITTER POWER CONV.
6	M55342K06B6E19 R	RESISTOR	6190-1-100MW	BUY	3	RECEIVER RF MODULE ASSY
6	M55342K06B6E98 R	RESISTOR	6.98K-1-100MW	BUY	1	RECEIVER RF MODULE ASSY

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PTI CD	PART NUMBER	Part Type	PART VALUE	Make - Buy	Qty/ Assy	Assy
6	M55342K06B73D2 R	RESISTOR	73.2-1-100MW	BUY	4	UPCONVERTER ASSEMBLY
6	M55342K06B750D R	RESISTOR, FIXED, FILM, CHIP	750-1-.1	BUY	1	RECEIVER RF MODULE ASSY
6	M55342K06B75D0 R	RESISTOR, FIXED, FILM, CHIP	75-1-.1	BUY	3	RECEIVER RF MODULE ASSY
6	M55342K06B75E0 R	RESISTOR, FIXED, FILM, CHIP	75000-1-.1	BUY	2	POWER AMPLIFIER ASSEMBLY
6	M55342K06B76D8 R	RESISTOR	76.8-1-100MW	BUY	1	TCXO PWB ASSEMBLY
6	M55342K06B7E15 R	RESISTOR	7150-1-100MW	BUY	1	RECEIVER RF MODULE ASSY
6	M55342K06B7E50 R	RESISTOR, FIXED, FILM, CHIP	7500-1-.1	BUY	1	RECEIVER RF MODULE ASSY
6	M55342K06B7E50 R	RESISTOR, FIXED, FILM, CHIP	7500-1-.1	BUY	1	TRANSMITTER POWER CONV.
6	M55342K06B7E68 R	RESISTOR	7680-1-100MW	BUY	1	RECEIVER RF MODULE ASSY
6	M55342K06B825D R	RESISTOR, FIXED, FILM, CHIP	825-1-.1	BUY	1	RECEIVER RF MODULE ASSY
6	M55342K06B82D5 R	RESISTOR	82.5-1-100MW	BUY	11	UPCONVERTER ASSEMBLY
6	M55342K06B82E5 R	RESISTOR	82.5K-1-100MW	BUY	2	POWER AMPLIFIER ASSEMBLY
6	M55342K06B8D25 R	RESISTOR	8.25-1-100MW	BUY	16	UPCONVERTER ASSEMBLY
6	M55342K06B8E06 R	RESISTOR	8060-1-100MW	BUY	1	RECEIVER RF MODULE ASSY
6	M55342K06B8E25 R	RESISTOR, FIXED, FILM, CHIP	8250-1-.1	BUY	1	TRANSMITTER POWER CONV.
6	M55342K06B8E45 R	RESISTOR	8450-1-100MW	BUY	1	RECEIVER POWER CONVERTER
6	M55342K06B909D R	RESISTOR	909-1-100MW	BUY	1	RECEIVER RF MODULE ASSY
6	M55342K06B90D9 R	RESISTOR	90.9-1-100MW	BUY	6	UPCONVERTER ASSEMBLY
6	M55342K06B90E9 R	RESISTOR	90.9K-1-100MW	BUY	2	POWER AMPLIFIER ASSEMBLY
6	M55342K06B90E9 R	RESISTOR	90.9K-1-100MW	BUY	2	RECEIVER RF MODULE ASSY
6	M55342K06B9E09 R	RESISTOR	9090-1-100MW	BUY	1	RECEIVER POWER CONVERTER
6	M55342K06B9E09 R	RESISTOR	9090-1-100MW	BUY	1	TRANSMITTER POWER CONV.
6	M55342K06B9E53 R	RESISTOR	9530-1-100MW	BUY	1	RECEIVER POWER CONVERTER
6	M55342K06B9E53 R	RESISTOR	9530-1-100MW	BUY	1	TRANSMITTER POWER CONV.
6	M55342K06B9E76 R	RESISTOR	9760-1-100MW	BUY	1	RECEIVER POWER CONVERTER
6	M8340115K1200GA	RESISTOR NETWORK	120-2-0.35	BUY	3	DIGITAL PROCESSOR
6	RLR05C1002FS	RESISTOR	10K-1-1/8	BUY	1	TRANSPONDER
6	RLR05C1052FS	RESISTOR	10.5K-1-1/8	BUY	1	TRANSPONDER
6	RLR05C3321FS	RESISTOR	3320-1-1/8	BUY	1	TRANSPONDER
6	RLR05C3401FS	RESISTOR	3400-1-.125	BUY	1	TRANSPONDER

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PTI CD	PART NUMBER	Part Type	PART VALUE	Make - Buy	Qty/ Assy	Assy
6	RLR05C3571FS	RESISTOR	3570-1-1/8	BUY	1	TRANSPONDER
6	RLR05C3651FS	RESISTOR	3650-1-1/8	BUY	1	TRANSPONDER
6	RLR05C3741FS	RESISTOR	3740-1-1/8	BUY	1	TRANSPONDER
6	RLR05C3921FS	RESISTOR	3920-1-1/8	BUY	1	TRANSPONDER
6	RLR05C4021FS	RESISTOR	4020-1-1/8	BUY	1	TRANSPONDER
6	RLR05C4121FS	RESISTOR	4120-1-1/8	BUY	1	TRANSPONDER
6	RLR05C4321FS	RESISTOR, LEADED, FIXED, FILM	4320-1-.125	BUY	1	TRANSPONDER
6	RLR05C4421FS	RESISTOR	4420-1-1/8	BUY	1	TRANSPONDER
6	RLR05C4561FS	RESISTOR	4560-1-.125	BUY	1	TRANSPONDER
6	RLR05C4751FS	RESISTOR	4750-1-1/8	BUY	1	TRANSPONDER
6	RLR05C4871FS	RESISTOR	4870-1-1/8	BUY	1	TRANSPONDER
6	RLR05C5111FS	RESISTOR, LEADED, FIXED, FILM	5110-1-.125	BUY	1	TRANSPONDER
6	RLR05C5231FS	RESISTOR	5230-1-1/8	BUY	1	TRANSPONDER
6	RLR05C5491FS	RESISTOR	5490-1-1/8	BUY	1	TRANSPONDER
6	RLR05C5621FS	RESISTOR	5620-1-1/8	BUY	1	TRANSPONDER
6	RLR05C5761FS	RESISTOR	5760-1-1/8	BUY	1	TRANSPONDER
6	RLR05C6041FS	RESISTOR	6040-1-1/8	BUY	1	TRANSPONDER
6	RLR05C6191FS	RESISTOR	6190-1-1/8	BUY	1	TRANSPONDER
6	RLR05C6491FS	RESISTOR	6490-1-1/8	BUY	1	TRANSPONDER
6	RLR05C6651FS	RESISTOR	6650-1-1/8	BUY	1	TRANSPONDER
6	RLR05C6981FS	RESISTOR	6980-1-1/8	BUY	1	TRANSPONDER
6	RLR05C7321FS	RESISTOR	7320-1-1/8	BUY	1	TRANSPONDER
6	RLR05C7501FS	RESISTOR	7500-1-1/8	BUY	1	TRANSPONDER
6	RLR05C7871FS	RESISTOR	7870-1-1/8	BUY	1	TRANSPONDER
6	RLR05C8061FS	RESISTOR	8060-1-1/8	BUY	1	TRANSPONDER
6	RLR05C8451FS	RESISTOR	8450-1-1/8	BUY	1	TRANSPONDER
6	RLR05C8871FS	RESISTOR	8870-1-1/8	BUY	1	TRANSPONDER
6	RLR05C9311FS	RESISTOR	9310-1-1/8	BUY	1	TRANSPONDER
6	RLR05C9531FS	RESISTOR	9530-1-1/8	BUY	1	TRANSPONDER
6	RNC90Y10K000F R	RESISTOR, FIXED, FILM	10K-1-.30	BUY	1	RECEIVER POWER CONVERTER

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PTI CD	PART NUMBER	Part Type	PART VALUE	Make - Buy	Qty/ Assy	Assy
6	RNC90Y10K000FR	RESISTOR, FIXED, FILM	10K-1-.30	BUY	1	TRANSMITTER POWER CONV.
6	RNC90Y24K900FR	RESISTOR	24.9K-1-.30	BUY	1	RECEIVER POWER CONVERTER
6	RNC90Y24K900FR	RESISTOR	24.9K-1-.30	BUY	1	TRANSMITTER POWER CONV.
6	RWR81SR215FR	RESISTOR, LEADED, WIREWOUND	.215-1-1	BUY	1	TRANSMITTER POWER CONV.
6	RWR81SR511FR	RESISTOR	.511-1-1	BUY	1	RECEIVER POWER CONVERTER
6	RWR81SR511FR	RESISTOR	.511-1-1	BUY	1	TRANSMITTER POWER CONV.
6	RWR81SR681FR	RESISTOR, LEADED, WIREWOUND	.681-1-1	BUY	1	RECEIVER POWER CONVERTER
6	RWR89S3160FR	RESISTOR, LEADED, WIREWOUND	316-1-3	BUY	4	TRANSMITTER POWER CONV.
21	21-P40307E001	CAPACITOR	.01UF-10-50	BUY	43	DIGITAL PROCESSOR
21	21-P40307E002	CAPACITOR	.068-10-50	BUY	1	POWER AMPLIFIER ASSEMBLY
21	21-P40307E003	CAPACITOR	.1UF-10-50	BUY	55	DIGITAL PROCESSOR
21	21-P40307E003	CAPACITOR	.1UF-10-50	BUY	5	RECEIVER POWER CONVERTER
21	21-P40307E003	CAPACITOR	.1UF-10-50	BUY	5	TRANSMITTER POWER CONV.
21	21-P40307E004	CAPACITOR	0.15UF-10-50	BUY	2	POWER AMPLIFIER ASSEMBLY
21	21-P40307E004	CAPACITOR	0.15UF-10-50	BUY	1	RECEIVER POWER CONVERTER
21	21-P40307E004	CAPACITOR	0.15UF-10-50	BUY	3	RECEIVER RF MODULE ASSY
21	21-P40307E004	CAPACITOR	0.15UF-10-50	BUY	1	TCXO PWB ASSEMBLY
21	21-P40307E005	CAPACITOR	.047UF-10-50	BUY	2	TRANSMITTER POWER CONV.
21	21-P40307E005	CAPACITOR	.047UF-10-50	BUY	6	RECEIVER POWER CONVERTER
21	21-P40307E005	CAPACITOR	.047UF-10-50	BUY	2	RECEIVER RF MODULE ASSY
21	21-P40307E006	CAPACITOR	1000PF-5-50	BUY	9	TRANSMITTER POWER CONV.
21	21-P40307E007	CAPACITOR	560PF-5-50	BUY	7	RECEIVER RF MODULE ASSY
21	21-P40307E008	CAPACITOR	150PF-5-50	BUY	2	UPCONVERTER ASSEMBLY
21	21-P40307E008	CAPACITOR	150PF-5-50	BUY	1	RECEIVER RF MODULE ASSY
21	21-P40307E009	CAPACITOR	220PF-5-50	BUY	2	TCXO PWB ASSEMBLY
21	21-P40307E010	CAPACITOR	330PF-5-50	BUY	1	RECEIVER RF MODULE ASSY
21	21-P40307E011	CAPACITOR	39000PF-10-50	BUY	2	RECEIVER RF MODULE ASSY
21	21-P40307E011	CAPACITOR	39000PF-10-50	BUY	4	POWER AMPLIFIER ASSEMBLY
21	21-P40307E011	CAPACITOR	39000PF-10-50	BUY	6	RECEIVER RF MODULE ASSY
						UPCONVERTER ASSEMBLY

PTI CD	PART NUMBER	Part Type	PART VALUE	Make - Buy	Qty/ Assy	Assy
21	21-P40307E012	CAPACITOR	110PF-5-50	BUY	1	TCXO PWB ASSEMBLY
21	21-P40307E013	CAPACITOR	120PF-5-50	BUY	1	TCXO PWB ASSEMBLY
21	21-P40307E014	CAPACITOR	130PF-5-50	BUY	1	TCXO PWB ASSEMBLY
21	21-P40308E001	CAPACITOR	4.7UF-10-50	BUY	5	RECEIVER POWER CONVERTER
21	21-P40308E001	CAPACITOR	4.7UF-10-50	BUY	6	TRANSMITTER POWER CONV.
21	21-P40308E002	CAPACITOR	12UF-10-50	BUY	2	RECEIVER POWER CONVERTER
21	21-P40308E002	CAPACITOR	12UF-10-50	BUY	5	TRANSMITTER POWER CONV.
21	21-P40308E003	CAPACITOR	3.3UF-10-50	BUY	2	DIGITAL PROCESSOR
21	87106-055	CAPACITOR	.68UF-10-100	BUY	2	RECEIVER POWER CONVERTER
21	87106-055	CAPACITOR	.68UF-10-100	BUY	2	TRANSMITTER POWER CONV.
21	87106-061	CAPACITOR	1.2UF-10-100	BUY	6	DIGITAL PROCESSOR
21	87106-079	CAPACITOR	6.8UF-10-100	BUY	3	RECEIVER POWER CONVERTER
21	87106-079	CAPACITOR	6.8UF-10-100	BUY	5	TRANSMITTER POWER CONV.
21	CDR12BG150KJU S	CAPACITOR	15PF-5-150	BUY	1	UPCONVERTER ASSEMBLY
21	CDR12BG180KJU S	CAPACITOR	18PF-5-150	BUY	1	UPCONVERTER ASSEMBLY
21	CDR12BG200KJU S	CAPACITOR	20PF-5-150	BUY	1	UPCONVERTER ASSEMBLY
21	CDR12BG220KJU S	CAPACITOR	22PF-5-150	BUY	2	UPCONVERTER ASSEMBLY
21	CDR12BG240KJU S	CAPACITOR	24PF-5-150	BUY	1	UPCONVERTER ASSEMBLY
21	CDR12BG270KJU S	CAPACITOR	27PF-5-150	BUY	1	UPCONVERTER ASSEMBLY
21	CDR12BG470KJU S	CAPACITOR	47PF-5-150	BUY	1	UPCONVERTER ASSEMBLY
21	CDR12BP0R1KBU S	CAPACITOR	0.1PF-0.1PF-150	BUY	1	UPCONVERTER ASSEMBLY
21	CDR12BP0R2KBU S	CAPACITOR	0.2PF-0.1PF-150	BUY	1	UPCONVERTER ASSEMBLY
21	CDR12BP0R5KBU S	CAPACITOR	0.5PF-0.1PF-150	BUY	2	UPCONVERTER ASSEMBLY
21	CDR12BP100KJU S	CAPACITOR, CERAMIC, CHIP	10PF-5-150	BUY	1	POWER AMPLIFIER ASSEMBLY
21	CDR12BP100KJU S	CAPACITOR, CERAMIC, CHIP	10PF-5-150	BUY	4	RECEIVER RF MODULE ASSY
21	CDR12BP100KJU S	CAPACITOR, CERAMIC, CHIP	10PF-5-150	BUY	2	UPCONVERTER ASSEMBLY
21	CDR12BP101KJU S	CAPACITOR, CERAMIC, CHIP	100PF-5-150	BUY	2	POWER AMPLIFIER ASSEMBLY
21	CDR12BP101KJU S	CAPACITOR, CERAMIC, CHIP	100PF-5-150	BUY	9	RECEIVER RF MODULE ASSY
21	CDR12BP101KJU S	CAPACITOR, CERAMIC, CHIP	100PF-5-150	BUY	1	TCXO PWB ASSEMBLY
21	CDR12BP120KJU S	CAPACITOR	12PF-5-150	BUY	2	UPCONVERTER ASSEMBLY

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PTI CD	PART NUMBER	Part Type	PART VALUE	Make - Buy	Qty/ Assy	Assy
21	CDR12BP150KJU S	CAPACITOR, CERAMIC, CHIP	15PF-5-150	BUY	11	POWER AMPLIFIER ASSEMBLY
21	CDR12BP150KJU S	CAPACITOR, CERAMIC, CHIP	15PF-5-150	BUY	13	RECEIVER RF MODULE ASSY
21	CDR12BP150KJU S	CAPACITOR, CERAMIC, CHIP	15PF-5-150	BUY	2	UPCONVERTER ASSEMBLY
21	CDR12BP180KJU S	CAPACITOR, CERAMIC, CHIP	18PF-5-150	BUY	1	RECEIVER RF MODULE ASSY
21	CDR12BP180KJU S	CAPACITOR, CERAMIC, CHIP	18PF-5-150	BUY	1	TCXO PWB ASSEMBLY
21	CDR12BP180KJU S	CAPACITOR, CERAMIC, CHIP	18PF-5-150	BUY	2	UPCONVERTER ASSEMBLY
21	CDR12BP1R0KDU S	CAPACITOR	1PF-0.5PF-150	BUY	1	TCXO PWB ASSEMBLY
21	CDR12BP1R0KDU S	CAPACITOR	1PF-0.5PF-150	BUY	2	UPCONVERTER ASSEMBLY
21	CDR12BP1R2KBU S	CAPACITOR	1.2PF-0.1PF-150	BUY	2	RECEIVER RF MODULE ASSY
21	CDR12BP1R2KDU S	CAPACITOR	1.2PF-0.1-150	BUY	1	TCXO PWB ASSEMBLY
21	CDR12BP1R2KDU S	CAPACITOR	1.2PF-0.1-150	BUY	1	UPCONVERTER ASSEMBLY
21	CDR12BP1R3KBU S	CAPACITOR	1.3PF-0.10PF-150	BUY	1	RECEIVER RF MODULE ASSY
21	CDR12BP1R5KBU S	CAPACITOR	1.5PF-0.1PF-150	BUY	2	RECEIVER RF MODULE ASSY
21	CDR12BP1R5KDU S	CAPACITOR	1.5PF-0.5PF-150	BUY	1	TCXO PWB ASSEMBLY
21	CDR12BP1R8KBU S	CAPACITOR	1.8PF-0.1PF-150	BUY	4	RECEIVER RF MODULE ASSY
21	CDR12BP1R8KDU S	CAPACITOR	1.8PF-.5-150	BUY	1	TCXO PWB ASSEMBLY
21	CDR12BP200KJU S	CAPACITOR	20PF-5-150	BUY	2	TCXO PWB ASSEMBLY
21	CDR12BP220KJU S	CAPACITOR, CERAMIC, CHIP	22PF-5-150	BUY	1	RECEIVER RF MODULE ASSY
21	CDR12BP220KJU S	CAPACITOR, CERAMIC, CHIP	22PF-5-150	BUY	2	TCXO PWB ASSEMBLY
21	CDR12BP240KJU S	CAPACITOR,CHIP, HIGH FREQ	24PF-5-150	BUY	1	RECEIVER RF MODULE ASSY
21	CDR12BP240KJU S	CAPACITOR,CHIP, HIGH FREQ	24PF-5-150	BUY	2	TCXO PWB ASSEMBLY
21	CDR12BP240KJU S	CAPACITOR,CHIP, HIGH FREQ	24PF-5-150	BUY	2	UPCONVERTER ASSEMBLY
21	CDR12BP270KJU S	CAPACITOR	27PF-5-150	BUY	2	RECEIVER RF MODULE ASSY
21	CDR12BP270KJU S	CAPACITOR	27PF-5-150	BUY	1	TCXO PWB ASSEMBLY
21	CDR12BP270KJU S	CAPACITOR	27PF-5-150	BUY	2	UPCONVERTER ASSEMBLY
21	CDR12BP2R0KBU S	CAPACITOR	2.0PF-0.1PF-150	BUY	1	RECEIVER RF MODULE ASSY
21	CDR12BP2R0KDU S	CAPACITOR	2.0PF-.5-150	BUY	1	TCXO PWB ASSEMBLY
21	CDR12BP2R2KDU S	CAPACITOR	2.2PF-.5-150	BUY	1	UPCONVERTER ASSEMBLY
21	CDR12BP2R7KDU S	CAPACITOR	2.7PF-.1-150	BUY	1	UPCONVERTER ASSEMBLY
21	CDR12BP300KJU S	CAPACITOR,CHIP, HIGH FREQ	30PF-5-150	BUY	2	UPCONVERTER ASSEMBLY

PTI CD	PART NUMBER	Part Type	PART VALUE	Make - Buy	Qty/ Assy	Assy
21	CDR12BP330KJU S	CAPACITOR	33PF-5-150	BUY	3	RECEIVER RF MODULE ASSY
21	CDR12BP330KJU S	CAPACITOR	33PF-5-150	BUY	2	UPCONVERTER ASSEMBLY
21	CDR12BP360KJU S	CAPACITOR	36PF-5-150	BUY	3	RECEIVER RF MODULE ASSY
21	CDR12BP360KJU S	CAPACITOR	36PF-5-150	BUY	2	UPCONVERTER ASSEMBLY
21	CDR12BP390KJU S	CAPACITOR, CERAMIC, CHIP	39PF-5-150	BUY	3	RECEIVER RF MODULE ASSY
21	CDR12BP390KJU S	CAPACITOR, CERAMIC, CHIP	39PF-5-150	BUY	1	UPCONVERTER ASSEMBLY
21	CDR12BP3R0KDU S	CAPACITOR	3.0PF-.1-150	BUY	1	TCXO PWB ASSEMBLY
21	CDR12BP3R0KDU S	CAPACITOR	3.0PF-.1-150	BUY	2	UPCONVERTER ASSEMBLY
21	CDR12BP3R3KBU S	CAPACITOR, CERAMIC, CHIP	3.3PF-.10PF-150	BUY	1	RECEIVER RF MODULE ASSY
21	CDR12BP3R3KDU S	CAPACITOR	3.3PF-0.1-150	BUY	2	UPCONVERTER ASSEMBLY
21	CDR12BP3R6KDU S	CAPACITOR	3.6PF-.1-150	BUY	1	TCXO PWB ASSEMBLY
21	CDR12BP3R6KDU S	CAPACITOR	3.6PF-.1-150	BUY	2	UPCONVERTER ASSEMBLY
21	CDR12BP3R9KBU S	CAPACITOR	3.9PF-0.1-150	BUY	4	RECEIVER RF MODULE ASSY
21	CDR12BP3R9KDU S	CAPACITOR	3.9PF-0.1-150	BUY	1	TCXO PWB ASSEMBLY
21	CDR12BP3R9KDU S	CAPACITOR	3.9PF-0.1-150	BUY	3	UPCONVERTER ASSEMBLY
21	CDR12BP430KJU S	CAPACITOR	43PF-5-150	BUY	1	TCXO PWB ASSEMBLY
21	CDR12BP430KJU S	CAPACITOR	43PF-5-150	BUY	1	UPCONVERTER ASSEMBLY
21	CDR12BP470KJU S	CAPACITOR, CERAMIC, CHIP	47PF-5-150	BUY	1	POWER AMPLIFIER ASSEMBLY
21	CDR12BP470KJU S	CAPACITOR, CERAMIC, CHIP	47PF-5-150	BUY	9	RECEIVER RF MODULE ASSY
21	CDR12BP470KJU S	CAPACITOR, CERAMIC, CHIP	47PF-5-150	BUY	1	TCXO PWB ASSEMBLY
21	CDR12BP470KJU S	CAPACITOR, CERAMIC, CHIP	47PF-5-150	BUY	1	UPCONVERTER ASSEMBLY
21	CDR12BP4R3KDU S	CAPACITOR	4.3PF-0.5-150	BUY	1	TCXO PWB ASSEMBLY
21	CDR12BP4R7KDU S	CAPACITOR	4.7PF-0.5-150	BUY	1	UPCONVERTER ASSEMBLY
21	CDR12BP510KJU S	CAPACITOR	51PF-5-150	BUY	2	TCXO PWB ASSEMBLY
21	CDR12BP510KJU S	CAPACITOR	51PF-5-150	BUY	1	UPCONVERTER ASSEMBLY
21	CDR12BP560KJU S	CAPACITOR	56PF-5-150	BUY	2	RECEIVER RF MODULE ASSY
21	CDR12BP560KJU S	CAPACITOR	56PF-5-150	BUY	2	TCXO PWB ASSEMBLY
21	CDR12BP560KJU S	CAPACITOR	56PF-5-150	BUY	1	UPCONVERTER ASSEMBLY
21	CDR12BP5R1KDU S	CAPACITOR	5.1PF-0.5PF-150	BUY	1	TCXO PWB ASSEMBLY
21	CDR12BP5R6KDU S	CAPACITOR	5.6PF-0.5-150	BUY	1	UPCONVERTER ASSEMBLY

PTI CD	PART NUMBER	Part Type	PART VALUE	Make - Buy	Qty/ Assy	Assy
21	CDR12BP620KJU S	CAPACITOR, CERAMIC, CHIP	62PF-5-150	BUY	2	RECEIVER RF MODULE ASSY
21	CDR12BP620KJU S	CAPACITOR, CERAMIC, CHIP	62PF-5-150	BUY	2	TCXO PWB ASSEMBLY
21	CDR12BP6R8KJU S	CAPACITOR	6.8PF-5-150	BUY	7	RECEIVER RF MODULE ASSY
21	CDR12BP820KJU S	CAPACITOR, CERAMIC, CHIP	82PF-5-150	BUY	1	RECEIVER RF MODULE ASSY
21	CDR12BP820KJU S	CAPACITOR, CERAMIC, CHIP	82PF-5-150	BUY	1	TCXO PWB ASSEMBLY
21	CDR12BP8R2KJU S	CAPACITOR	8.2PF-5-150	BUY	1	RECEIVER RF MODULE ASSY
21	CDR12BP910KJU S	CAPACITOR	91PF-5-150	BUY	1	TCXO PWB ASSEMBLY
21	CDR31BP101BJW S	CAPACITOR,CERAMIC,CHIP	100PF-5-100	BUY	2	TRANSMITTER POWER CONV.
21	CDR31BP101BKW S	CAPACITOR	100PF-10-100	BUY	1	RECEIVER POWER CONVERTER
21	CDR31BP181BJW S	CAPACITOR,CERAMIC,CHIP	180PF-5-100	BUY	2	UPCONVERTER ASSEMBLY
21	CDR31BP201BJW S	CAPACITOR	200PF-5-100	BUY	2	UPCONVERTER ASSEMBLY
21	CDR31BP201BKW S	CAPACITOR	200PF-1-100	BUY	1	TCXO PWB ASSEMBLY
21	CDR31BP221BJW S	CAPACITOR,CERAMIC,CHIP	220PF-5-100	BUY	2	UPCONVERTER ASSEMBLY
21	CDR31BP221BKW S	CAPACITOR,CERAMIC,CHIP	220PF-5-100	BUY	1	TCXO PWB ASSEMBLY
21	CDR31BP241BJW S	CAPACITOR	240-5-100	BUY	2	UPCONVERTER ASSEMBLY
21	CDR31BP241BKW S	CAPACITOR	240PF-1-100	BUY	1	TCXO PWB ASSEMBLY
21	CDR31BP271BJW S	CAPACITOR,CERAMIC,CHIP	270PF-5-100	BUY	2	UPCONVERTER ASSEMBLY
21	CDR31BP300BJW S	CAPACITOR	30PF-5-100	BUY	1	DIGITAL PROCESSOR
21	CDR31BP330BJW S	CAPACITOR,CERAMIC,CHIP	33PF-5-100	BUY	1	TRANSMITTER POWER CONV.
21	CDR31BP330BKW S	CAPACITOR	33PF-10-100	BUY	1	RECEIVER POWER CONVERTER
21	CDR31BP470BJW S	CAPACITOR,CERAMIC,CHIP	47PF-5-100	BUY	2	UPCONVERTER ASSEMBLY
21	CDR31BP510BJW S	CAPACITOR,CERAMIC,CHIP	51PF-5-100	BUY	2	UPCONVERTER ASSEMBLY
21	CDR31BP560BJW S	CAPACITOR,CERAMIC,CHIP	56PF-5-100	BUY	2	UPCONVERTER ASSEMBLY
21	CDR31BP620BJW S	CAPACITOR	62-5-100	BUY	2	UPCONVERTER ASSEMBLY
21	CDR31BP680BJW S	CAPACITOR,CERAMIC,CHIP	68-5-100	BUY	2	UPCONVERTER ASSEMBLY
21	CDR31BX102BKW S	CAPACITOR,CERAMIC,CHIP	1000PF-10-100	BUY	12	UPCONVERTER ASSEMBLY
21	CDR31BX272BKW S	CAPACITOR,CERAMIC,CHIP	2700PF-10-100	BUY	1	UPCONVERTER ASSEMBLY
21	CDR31BX332BKW S	CAPACITOR,CERAMIC,CHIP	3300PF-10-100	BUY	22	TCXO PWB ASSEMBLY
21	CDR31BX332BKW S	CAPACITOR,CERAMIC,CHIP	3300PF-10-100	BUY	4	UPCONVERTER ASSEMBLY
21	CDR31BX472BKW S	CAPACITOR,CERAMIC,CHIP	4700PF-10-100	BUY	1	DIGITAL PROCESSOR



PTI CD	PART NUMBER	Part Type	PART VALUE	Make - Buy	Qty/ Assy	Assy
21	CDR31BX472BKW S	CAPACITOR,CERAMIC,CHIP	4700PF-10-100	BUY	5	RECEIVER RF MODULE
21	CDR31BX472BKW S	CAPACITOR,CERAMIC,CHIP	4700PF-10-100	BUY	5	ASSY UPCONVERTER ASSEMBLY
21	CDR32BP102BJW S	CAPACITOR,CERAMIC,CHIP	1000PF-5-100	BUY	3	DIGITAL PROCESSOR
21	CDR32BP102BJW S	CAPACITOR,CERAMIC,CHIP	1000PF-5-100	BUY	6	POWER AMPLIFIER
21	CDR32BP301BJW S	CAPACITOR	300PF-5-100	BUY	1	ASSEMBLY DIGITAL PROCESSOR
21	CDR32BP471BJW S	CAPACITOR	470PF-5-100	BUY	1	TRANSMITTER POWER
21	CDR32BX103BKW S	CAPACITOR,CERAMIC,CHIP	0.01UF-10-100	BUY	8	CONV. POWER AMPLIFIER
21	CDR32BX103BKW S	CAPACITOR,CERAMIC,CHIP	0.01UF-10-100	BUY	5	ASSEMBLY RECEIVER POWER
21	CDR32BX103BKW S	CAPACITOR,CERAMIC,CHIP	0.01UF-10-100	BUY	33	CONVERTER RECEIVER RF MODULE
21	CDR32BX103BKW S	CAPACITOR,CERAMIC,CHIP	0.01UF-10-100	BUY	4	ASSY TRANSMITTER POWER
21	CDR32BX103BKW S	CAPACITOR,CERAMIC,CHIP	0.01UF-10-100	BUY	4	CONV. UPCONVERTER ASSEMBLY
21	CDR33BP152BJW S	CAPACITOR,CERAMIC,CHIP	1500PF-5-100	BUY	1	RECEIVER POWER
21	CDR34BP222BJW S	CAPACITOR,CERAMIC,CHIP	2200PF-5-100	BUY	1	CONVERTER RECEIVER POWER
21	CDR34BP222BJW S	CAPACITOR,CERAMIC,CHIP	2200PF-5-100	BUY	1	CONVERTER TRANSMITTER POWER
21	CDR34BP392BJW S	CAPACITOR,CERAMIC,CHIP	3900PF-5-100	BUY	1	CONV. RECEIVER RF MODULE
21	CDR34BP472BJW S	CAPACITOR,CERAMIC,CHIP	4700PF-5-100	BUY	2	ASSY RECEIVER POWER
21	CDR34BP472BJW S	CAPACITOR,CERAMIC,CHIP	4700PF-5-100	BUY	1	CONVERTER TRANSMITTER POWER
21	CDR34BX473BKW S	CAPACITOR,CERAMIC,CHIP	.047UF-10-100	BUY	3	CONV. UPCONVERTER ASSEMBLY
21	CDR34BX563BKW S	CAPACITOR	.056UF-10-100	BUY	4	RECEIVER POWER
21	CDR34BX563BKW S	CAPACITOR	.056UF-10-100	BUY	5	CONVERTER TRANSMITTER POWER
21	CWR06FC336KB	CAPACITOR	33UF-10-10	BUY	1	CONV. DIGITAL PROCESSOR
21	CWR06FC336KB	CAPACITOR	33UF-10-10	BUY	3	RECEIVER POWER
21	CWR06FC336KB	CAPACITOR	33UF-10-10	BUY	3	CONVERTER TRANSMITTER POWER
21	CWR06HC335KB	CAPACITOR	3.3UF-10-15	BUY	2	CONV. RECEIVER RF MODULE
21	CWR06HC335KB	CAPACITOR	3.3UF-10-15	BUY	1	ASSY TCXO PWB ASSEMBLY
21	CWR06KC155KB	CAPACITOR	1.5UF-10-25	BUY	3	RECEIVER RF MODULE
21	CWR06KC156KB	CAPACITOR	15UF-10-25	BUY	3	ASSY RECEIVER POWER
21	CWR06KC156KB	CAPACITOR	15UF-10-25	BUY	1	CONVERTER TRANSMITTER POWER
21	CWR06MC105KB	CAPACITOR	1.0UF-10-35	BUY	1	CONV. UPCONVERTER ASSEMBLY
21	CWR06MC155KB	CAPACITOR	1.5UF-10-35	BUY	1	TCXO PWB ASSEMBLY

PTI CD	PART NUMBER	Part Type	PART VALUE	Make - Buy	Qty/ Assy	Assy
21	CWR06MC685KB	CAPACITOR	6.8UF-10-35	BUY	1	DIGITAL PROCESSOR
21	CWR06MC685KB	CAPACITOR	6.8UF-10-35	BUY	4	RECEIVER POWER CONVERTER
21	M39006/25-0195H	CAPACITOR	560UF-20-10	BUY	1	DIGITAL PROCESSOR
28	22MCX5002/111SS TG	CONNECTOR, RFMCX		BUY	4	DIGITAL PROCESSOR
28	22MCX5002/111SS TG	CONNECTOR, RFMCX		BUY	1	POWER AMPLIFIER ASSEMBLY
28	22MCX5002/111SS TG	CONNECTOR, RFMCX		BUY	4	RECEIVER RF MODULE ASSY
28	22MCX5002/111SS TG	CONNECTOR, RFMCX		BUY	5	UPCONVERTER ASSEMBLY
28	2367-0000-54	CONNECTOR, PLUG RECEPTACLE		BUY	4	POWER AMPLIFIER ASSEMBLY
28	2367-0000-54	CONNECTOR, PLUG RECEPTACLE		BUY	11	RECEIVER RF MODULE ASSY
28	2367-0000-54	CONNECTOR, PLUG RECEPTACLE		BUY	6	TCXO PWB ASSEMBLY
28	2367-0000-54	CONNECTOR, PLUG RECEPTACLE		BUY	8	UPCONVERTER ASSEMBLY
28	28-P38549Y001	CONNECTOR, ELECTRICAL	BJ3157F-2C	BUY	2	DIGITAL PROCESSOR
28	28-P39895P001	PIN,SMA		BUY	1	POWER AMPLIFIER ASSEMBLY
28	28-P39895P001	PIN,SMA		BUY	1	RECEIVER RF MODULE ASSY
28	28-P39895P002	CONNECTOR,SMA		BUY	1	POWER AMPLIFIER ASSEMBLY
28	28-P39895P002	CONNECTOR,SMA		BUY	1	RECEIVER RF MODULE ASSY
28	28-P40036E001	PROGRAMMING CONNECTOR	ASSEMBLY	MAKE	1	TRANSPONDER
28	M83513/03-B05N	CONNECTOR		BUY	2	ASSY, FLEXIBLE DC POWER
28	M83513/03-D05N	CONNECTOR		BUY	3	ASSY, FLEXIBLE DC POWER
28	M83513/03-D11N	CONNECTOR		BUY	1	DIGITAL PROCESSOR
28	M83513/03-F05N	CONNECTOR		BUY	1	ASSY, FLEXIBLE DC POWER
28	M83513/03-G11N	CONNECTOR		BUY	1	DIGITAL PROCESSOR
28	M83513/04-A11N	CONNECTOR		BUY	1	TRANSMITTER POWER CONV.
28	M83513/04-B11N	CONNECTOR		BUY	1	RECEIVER RF MODULE ASSY
28	M83513/04-B11N	CONNECTOR		BUY	1	UPCONVERTER ASSEMBLY
28	M83513/04-D05N	CONNECTOR		BUY	1	
28	M83513/04-D11N	CONNECTOR		BUY	1	POWER AMPLIFIER ASSEMBLY
28	M83513/04-D11N	CONNECTOR		BUY	2	RECEIVER POWER CONVERTER
28	M83513/04-D11N	CONNECTOR		BUY	1	TRANSMITTER POWER CONV.
28	M83513/04-F11N	CONNECTOR		BUY	1	DIGITAL PROCESSOR

PTI CD	PART NUMBER	Part Type	PART VALUE	Make - Buy	Qty/ Assy	Assy
28	M83513/5-02	CONNECTOR, JACKSCREW		BUY	1	ASSY, FLEXIBLE DC POWER
28	M83513/5-07	JACK POST ASSY		BUY	1	DIGITAL PROCESSOR
28	M83513/5-07	JACK POST ASSY		BUY	1	POWER AMPLIFIER ASSEMBLY
28	M83513/5-07	JACK POST ASSY		BUY	1	RECEIVER POWER CONVERTER
28	M83513/5-07	JACK POST ASSY		BUY	1	RECEIVER RF MODULE ASSY
28	M83513/5-07	JACK POST ASSY		BUY	1	TRANSMITTER POWER CONV.
28	M83513/5-07	JACK POST ASSY		BUY	1	UPCONVERTER ASSEMBLY
48	2223-1.7HV	TRANSISTOR	2223-1.7	BUY	1	POWER AMPLIFIER ASSEMBLY
48	2223-9AHV	TRANSISTOR	2223-9	BUY	1	POWER AMPLIFIER ASSEMBLY
48	48-P24290N001	TRANSISTOR	AT41470	BUY	1	RECEIVER RF MODULE ASSY
48	48-P24290N001	TRANSISTOR	AT41470	BUY	1	UPCONVERTER ASSEMBLY
48	48-P40301E001	TRANSISTOR	2N2857AUB	BUY	6	RECEIVER RF MODULE ASSY
48	48-P40301E001	TRANSISTOR	2N2857AUB	BUY	4	TCXO PWB ASSEMBLY
48	48-P40301E001	TRANSISTOR	2N2857AUB	BUY	4	UPCONVERTER ASSEMBLY
48	48-P40305E001	TRANSISTOR, NPN	2N2222AUB	BUY	2	POWER AMPLIFIER ASSEMBLY
48	48-P40305E001	TRANSISTOR, NPN	2N2222AUB	BUY	2	RECEIVER POWER CONVERTER
48	48-P40305E001	TRANSISTOR, NPN	2N2222AUB	BUY	1	RECEIVER RF MODULE ASSY
48	48-P40305E001	TRANSISTOR, NPN	2N2222AUB	BUY	2	TCXO PWB ASSEMBLY
48	48-P40305E001	TRANSISTOR, NPN	2N2222AUB	BUY	4	TRANSMITTER POWER CONV.
48	48-P40305E002	TRANSISTOR, PNP	2N2907AUB	BUY	2	POWER AMPLIFIER ASSEMBLY
48	48-P40305E002	TRANSISTOR, PNP	2N2907AUB	BUY	2	TRANSMITTER POWER CONV.
48	48-P40305E003	TRANSISTOR, NPN	2N5237	BUY	1	RECEIVER POWER CONVERTER
48	48-P40305E003	TRANSISTOR, NPN	2N5237	BUY	1	TRANSMITTER POWER CONV.
48	48-P40305E004	TRANSISTOR, POWER FET	R2N7262	BUY	3	RECEIVER POWER CONVERTER
48	48-P40305E005	SEMI CONDUCTOR DEVICE	2N7269	BUY	4	TRANSMITTER POWER CONV.
48	48-P40305E006	SEMICONDUCTOR DEVICE	4N49	BUY	2	TRANSMITTER POWER CONV.
48	48-P40309E003	SEMICONDUCTOR	MA42181-511	BUY	1	RECEIVER RF MODULE ASSY
48	48-P49941D001	TRANSISTOR	AT64023	BUY	1	POWER AMPLIFIER ASSEMBLY
48	DDC4717-89	DIODE, DETECTOR		BUY	5	RECEIVER RF MODULE ASSY
48	DSB4773-66	DIODE		BUY	1	POWER AMPLIFIER ASSEMBLY

PTI CD	PART NUMBER	Part Type	PART VALUE	Make - Buy	Qty/ Assy	Assy
48	JANTXV1N4104UR -1	DIODE, ZENER, 10V, 5%		BUY	2	RECEIVER POWER CONVERTER
48	JANTXV1N4104UR -1	DIODE, ZENER, 10V, 5%		BUY	2	TRANSMITTER POWER CONV.
48	JANTXV1N4617DU R-1	DIODE, ZENER		BUY	2	RECEIVER RF MODULE ASSY
48	JANTXV1N4625UR -1	DIODE, ZENER, 5.1V, 5%		BUY	1	POWER AMPLIFIER ASSEMBLY
48	JANTXV1N4958US	DIODE, ZENER, 10V, 5%		BUY	2	DIGITAL PROCESSOR
48	JANTXV1N5806US	DIODE, SILICON, RECTIFIER		BUY	8	RECEIVER POWER CONVERTER
48	JANTXV1N5806US	DIODE, SILICON, RECTIFIER		BUY	13	TRANSMITTER POWER CONV.
48	JANTXV1N5819UR -1	DIODE, SILICON, RECTIFIER		BUY	5	DIGITAL PROCESSOR
48	JANTXV1N5819UR -1	DIODE, SILICON, RECTIFIER		BUY	7	RECEIVER POWER CONVERTER
48	JANTXV1N5819UR -1	DIODE, SILICON, RECTIFIER		BUY	7	TRANSMITTER POWER CONV.
48	JANTXV1N6626US	DIODE, RECTIFIER	200V, 4A	BUY	6	RECEIVER POWER CONVERTER
48	JANTXV1N6626US	DIODE, RECTIFIER	200V, 4A	BUY	4	TRANSMITTER POWER CONV.
48	JANTXV1N6640US	DIODE, SILICON SWITCHING		BUY	1	POWER AMPLIFIER ASSEMBLY
48	JANTXV1N6640US	DIODE, SILICON SWITCHING		BUY	2	RECEIVER RF MODULE ASSY
48	JANTXV1N6640US	DIODE, SILICON SWITCHING		BUY	1	TRANSMITTER POWER CONV.
48	JANTXV1N829UR- 1	DIODE, REF, TEMP COMP,6.2V,5%		BUY	1	POWER AMPLIFIER ASSEMBLY
48	JANTXV1N829UR- 1	DIODE, REF, TEMP COMP,6.2V,5%		BUY	1	RECEIVER POWER CONVERTER
48	JANTXV1N829UR- 1	DIODE, REF, TEMP COMP,6.2V,5%		BUY	1	TCXO PWB ASSEMBLY
48	JANTXV1N829UR- 1	DIODE, REF, TEMP COMP,6.2V,5%		BUY	1	TRANSMITTER POWER CONV.
48	MA40258-276TXV	DIODE, DETECTOR	MA40528-276	BUY	3	POWER AMPLIFIER ASSEMBLY
48	MA45233-94TXV	DIODE, VARACTOR	4.7PF	BUY	1	RECEIVER RF MODULE ASSY
48	MA4ST563-94TXV	DIODE, VARACTOR	4.7PF	BUY	2	TCXO PWB ASSEMBLY
51	51-P24339N002	MICROCIRCUIT	MSA0670	BUY	2	UPCONVERTER ASSEMBLY
51	51-P24339N003	MICROCIRCUIT	MSA0770	BUY	1	RECEIVER RF MODULE ASSY
51	51-P34222W001	MICROCIRCUIT,CMOS,ASIC	TX/TONS	BUY	1	DIGITAL PROCESSOR
51	51-P34227W001	MICROCIRCUIT	AD9720	BUY	1	DIGITAL PROCESSOR
51	51-P40302E001	MICROCIRCUIT	HK17C, RCVR ASIC	BUY	1	DIGITAL PROCESSOR
51	51-P40306E001	MICROCIRCUIT	SG1846F	BUY	1	RECEIVER POWER CONVERTER
51	51-P40306E001	MICROCIRCUIT	SG1846F	BUY	1	TRANSMITTER POWER CONV.
51	51-P40306E004	MICROCIRCUIT	54ACT574	BUY	1	DIGITAL PROCESSOR

PTI CD	PART NUMBER	Part Type	PART VALUE	Make - Buy	Qty/ Assy	Assy
51	51-P40306E005	IC, VOLTAGE COMPARATOR	AD9696	BUY	2	DIGITAL PROCESSOR
51	51-P40306E006	MICROCIRCUIT	54ACT240	BUY	1	DIGITAL PROCESSOR
51	51-P40306E008	MICROCIRCUIT, OP AMP	LM108W	BUY	2	POWER AMPLIFIER ASSEMBLY
51	51-P40306E008	MICROCIRCUIT, OP AMP	LM108W	BUY	1	RECEIVER POWER CONVERTER
51	51-P40306E008	MICROCIRCUIT, OP AMP	LM108W	BUY	1	RECEIVER RF MODULE ASSY
51	51-P40306E008	MICROCIRCUIT, OP AMP	LM108W	BUY	2	TRANSMITTER POWER CONV.
51	51-P40306E009	MICROCIRCUIT	LM124W	BUY	1	POWER AMPLIFIER ASSEMBLY
51	51-P40306E009	MICROCIRCUIT	LM124W	BUY	2	RECEIVER RF MODULE ASSY
51	51-P40306E009	MICROCIRCUIT	LM124W	BUY	1	UPCONVERTER ASSEMBLY
51	51-P40306E010	MICROCIRCUIT	54AC32	BUY	1	DIGITAL PROCESSOR
51	51-P40306E011	MICROCIRCUIT	54AC14	BUY	1	DIGITAL PROCESSOR
51	51-P40306E012	MICROCIRCUIT	54AC244	BUY	1	DIGITAL PROCESSOR
51	51-P40306E015	MICROCIRCUIT	CLC505	BUY	1	RECEIVER RF MODULE ASSY
51	51-P40306E019	MICROCIRCUIT	UT63M147CBA	BUY	1	DIGITAL PROCESSOR
51	51-P40306E020	MICROCIRCUIT, OP AMP	OP27	BUY	1	RECEIVER RF MODULE ASSY
51	51-P40306E021	MICROCIRCUIT	54AC86	BUY	1	DIGITAL PROCESSOR
51	51-P40311E001	MICROCIRCUIT	RFIC	BUY	2	RECEIVER RF MODULE ASSY
51	51-P40312E001	MICROCIRCUIT	HS5104	BUY	1	TCXO PWB ASSEMBLY
51	51-P40322E001	MICROCIRCUIT, ECL	UPCONVERTER,4 CLOCKS	BUY	1	DIGITAL PROCESSOR
51	5962F9568901VXC	MICROCIRCUIT	QUAD DIFFERENTIAL LINE	BUY	3	DIGITAL PROCESSOR
51	5962F9666301VXC	MICROCIRCUIT	QUAD DIFFERENTIAL LINE	BUY	2	DIGITAL PROCESSOR
51	AM85-0007-S	MICROCIRCUIT, AMPLIFIER, GAAS MMIC		BUY	1	POWER AMPLIFIER ASSEMBLY
51	AM85-0007-S	MICROCIRCUIT, AMPLIFIER, GAAS MMIC		BUY	1	RECEIVER RF MODULE ASSY
51	AM85-0007-S	MICROCIRCUIT, AMPLIFIER, GAAS MMIC		BUY	2	UPCONVERTER ASSEMBLY
51	GSFC-735-2827-01	MULTI-CHIPMODULE	GSFC ESN MCM	BUY	1	DIGITAL PROCESSOR
52	MCM2760-8M	OSCILLATOR	12 MHZ	BUY	1	DIGITAL PROCESSOR
58	58-P34232W001	ISOLATOR		BUY	3	POWER AMPLIFIER ASSEMBLY
58	6013565001N3	ATTENUATOR	1DB N03	BUY	3	RECEIVER RF MODULE ASSY
58	6013565001N5	ATTENUATOR	1DB N05	BUY	3	RECEIVER RF MODULE ASSY
58	6013565001N7	ATTENUATOR	1DB N07	BUY	3	RECEIVER RF MODULE ASSY

PTI CD	PART NUMBER	Part Type	PART VALUE	Make - Buy	Qty/ Assy	Assy
58	6013565001P3	ATTENUATOR	1DB P03	BUY	3	RECEIVER RF MODULE ASSY
58	6013565001P3	ATTENUATOR	1DB P03	BUY	9	UPCONVERTER ASSEMBLY
58	6013565001P5	ATTENUATOR	1DB P05	BUY	3	RECEIVER RF MODULE ASSY
58	6013565001P5	ATTENUATOR	1DB P05	BUY	9	UPCONVERTER ASSEMBLY
58	6013565001P7	ATTENUATOR	1DB P07	BUY	3	RECEIVER RF MODULE ASSY
58	6013565001P7	ATTENUATOR	1DB P07	BUY	9	UPCONVERTER ASSEMBLY
58	6013565002N3	ATTENUATOR	2DB N03	BUY	3	RECEIVER RF MODULE ASSY
58	6013565002N5	ATTENUATOR	2DB N05	BUY	3	RECEIVER RF MODULE ASSY
58	6013565002N7	ATTENUATOR	2DB N07	BUY	3	RECEIVER RF MODULE ASSY
58	6013565002N7	ATTENUATOR	2DB N07	BUY	9	UPCONVERTER ASSEMBLY
58	6013565002P7	ATTENUATOR	2DB P07	BUY	3	RECEIVER RF MODULE ASSY
58	6013565003N3	ATTENUATOR	3DB N03	BUY	3	RECEIVER RF MODULE ASSY
58	6013565003N3	ATTENUATOR	3DB N03	BUY	9	UPCONVERTER ASSEMBLY
58	6013565003N5	ATTENUATOR	3DB N05	BUY	3	RECEIVER RF MODULE ASSY
58	6013565003N5	ATTENUATOR	3DB N05	BUY	9	UPCONVERTER ASSEMBLY
58	6013565003N7	ATTENUATOR	3DB N07	BUY	3	RECEIVER RF MODULE ASSY
58	6013565003N7	ATTENUATOR	3DB N07	BUY	9	UPCONVERTER ASSEMBLY
58	6013565003P3	ATTENUATOR	3DB P03	BUY	3	RECEIVER RF MODULE ASSY
58	6013565003P3	ATTENUATOR	3DB P03	BUY	9	UPCONVERTER ASSEMBLY
58	6013565003P5	ATTENUATOR	3DB P05	BUY	3	RECEIVER RF MODULE ASSY
58	6013565003P5	ATTENUATOR	3DB P05	BUY	9	UPCONVERTER ASSEMBLY
58	6013565003P7	ATTENUATOR	3DB P07	BUY	3	RECEIVER RF MODULE ASSY
58	6013565003P7	ATTENUATOR	3DB P07	BUY	9	UPCONVERTER ASSEMBLY
58	6013565004N3	ATTENUATOR	4DB N03	BUY	8	UPCONVERTER ASSEMBLY
58	6013565004N5	ATTENUATOR	4DB N05	BUY	8	UPCONVERTER ASSEMBLY
58	6013565004N7	ATTENUATOR	4DB N07	BUY	7	UPCONVERTER ASSEMBLY
58	6013565005N7	ATTENUATOR	5DB N07	BUY	5	UPCONVERTER ASSEMBLY
58	6013565006N3	ATTENUATOR	6DB N03	BUY	3	UPCONVERTER ASSEMBLY
58	6013565006N7	ATTENUATOR	6DB N07	BUY	3	UPCONVERTER ASSEMBLY
58	6013565007N3	ATTENUATOR	7DB N03	BUY	3	UPCONVERTER ASSEMBLY

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PTI CD	PART NUMBER	Part Type	PART VALUE	Make - Buy	Qty/ Assy	Assy
58	6013565007N7	ATTENUATOR	7DB N07	BUY	3	UPCONVERTER ASSEMBLY
58	6013565008N3	ATTENUATOR	8DB N03	BUY	2	UPCONVERTER ASSEMBLY
58	6013565008N7	ATTENUATOR	8DB N07	BUY	2	UPCONVERTER ASSEMBLY
58	6013645001	ATTENUATOR	1DB-2W	BUY	7	RECEIVER RF MODULE ASSY
58	6013645001	ATTENUATOR	1DB-2W	BUY	1	TCXO PWB ASSEMBLY
58	6013645001	ATTENUATOR	1DB-2W	BUY	10	UPCONVERTER ASSEMBLY
58	6013645002	ATTENUATOR	2DB-2W	BUY	8	RECEIVER RF MODULE ASSY
58	6013645002	ATTENUATOR	2DB-2W	BUY	1	TCXO PWB ASSEMBLY
58	6013645002	ATTENUATOR	2DB-2W	BUY	10	UPCONVERTER ASSEMBLY
58	6013645003	ATTENUATOR	3DB-2W	BUY	7	RECEIVER RF MODULE ASSY
58	6013645003	ATTENUATOR	3DB-2W	BUY	1	TCXO PWB ASSEMBLY
58	6013645003	ATTENUATOR	3DB-2W	BUY	11	UPCONVERTER ASSEMBLY
58	6013645004	ATTENUATOR	4DB-2W	BUY	7	RECEIVER RF MODULE ASSY
58	6013645004	ATTENUATOR	4DB-2W	BUY	1	TCXO PWB ASSEMBLY
58	6013645004	ATTENUATOR	4DB-2W	BUY	10	UPCONVERTER ASSEMBLY
58	6013645005	ATTENUATOR	5DB-2W	BUY	4	RECEIVER RF MODULE ASSY
58	6013645005	ATTENUATOR	5DB-2W	BUY	1	TCXO PWB ASSEMBLY
58	6013645005	ATTENUATOR	5DB-2W	BUY	5	UPCONVERTER ASSEMBLY
58	6013645006	ATTENUATOR	6DB-2W	BUY	1	RECEIVER RF MODULE ASSY
58	6013645006	ATTENUATOR	6DB-2W	BUY	1	TCXO PWB ASSEMBLY
58	6013645006	ATTENUATOR	6DB-2W	BUY	4	UPCONVERTER ASSEMBLY
58	6013645007	ATTENUATOR	7DB,2W	BUY	1	RECEIVER RF MODULE ASSY
58	6013645007	ATTENUATOR	7DB,2W	BUY	4	UPCONVERTER ASSEMBLY
58	6013645008	ATTENUATOR	8DB-2W	BUY	1	RECEIVER RF MODULE ASSY
58	6013645008	ATTENUATOR	8DB-2W	BUY	3	UPCONVERTER ASSEMBLY
58	6013645009	ATTENUATOR	9DB-2W	BUY	1	RECEIVER RF MODULE ASSY
58	6013645009	ATTENUATOR	9DB-2W	BUY	3	UPCONVERTER ASSEMBLY
58	6013645010	ATTENUATOR	10DB-2W	BUY	2	RECEIVER RF MODULE ASSY
58	6013645010	ATTENUATOR	10DB-2W	BUY	3	UPCONVERTER ASSEMBLY
58	DMG-2B-2000/7488 4	MIXER	MERRIMAC	BUY	1	UPCONVERTER ASSEMBLY

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PTI CD	PART NUMBER	Part Type	PART VALUE	Make - Buy	Qty/ Assy	Assy
58	DMG-2B-350/74883	MIXER	MERRIMAC	BUY	1	UPCONVERTER ASSEMBLY
58	SPD3510-90	HYBRID, SAMPLING PHASE	DETECTOR	BUY	1	RECEIVER RF MODULE ASSY
58	SR8800SPQ1800B Y	RESONATOR		BUY	1	RECEIVER RF MODULE ASSY
58	SR8800SPQ1810B Y	RESONATOR		BUY	1	RECEIVER RF MODULE ASSY
58	SR8800SPQ1820B Y	RESONATOR		BUY	1	RECEIVER RF MODULE ASSY
58	SR8800SPQ1830B Y	RESONATOR		BUY	1	RECEIVER RF MODULE ASSY
58	SR8800SPQ1840B Y	RESONATOR		BUY	1	RECEIVER RF MODULE ASSY
58	SR8800SPQ1850B Y	RESONATOR		BUY	1	RECEIVER RF MODULE ASSY
58	SR8800SPQ1860B Y	RESONATOR		BUY	1	RECEIVER RF MODULE ASSY
58	SR8800SPQ1870B Y	RESONATOR		BUY	1	RECEIVER RF MODULE ASSY
58	SR8800SPQ1880B Y	RESONATOR		BUY	1	RECEIVER RF MODULE ASSY
58	SR8800SPQ1890B Y	RESONATOR		BUY	1	RECEIVER RF MODULE ASSY
58	SR8800SPQ1900B Y	RESONATOR		BUY	1	RECEIVER RF MODULE ASSY
58	SR8800SPQ1910B Y	RESONATOR		BUY	1	RECEIVER RF MODULE ASSY
58	SR8800SPQ1920B Y	RESONATOR		BUY	1	RECEIVER RF MODULE ASSY
58	SR8800SPQ1930B Y	RESONATOR		BUY	1	RECEIVER RF MODULE ASSY
58	SR8800SPQ1940B Y	RESONATOR		BUY	1	RECEIVER RF MODULE ASSY
58	SR8800SPQ1950B Y	RESONATOR		BUY	1	RECEIVER RF MODULE ASSY



## **APPENDIX B**

(TDRSS IV Mechanical Parts Tin Plating Requirement Study)

## **B.1 Scope**

This appendix documents the plating requirements for the mechanical parts used in the TDRSS IV transponder manufactured by MOTOROLA, SSG. The intent of this appendix is to identify any mechanical part that does not have adequate requirements to prevent the use of a pure tin finish.

### **B.1.1 Appendix Structure**

This appendix is divided into the following sections:

#### **B.1 Scope**

#### **B.2 Summary of the plating requirements for mechanical components and risk assesment.**

#### **B.3 Material finish requirements for mechanical parts.**

#### **B.4 Summary by part number with the quantity used per assembly for the mechanical components.**

### **B.1.2 Potential Risk Parts**

Risk parts are categorized based upon the imposed requirements in their procurement specifications in ascending order (e.g. 1 is considered no risk since the finish has been verified).

- 1: Parts that have the finish verified during Destructive Physical analysis on sample parts.
- 2: Parts procured to a Military Specification with a QML listing (qualified parts) that have a statement that prohibits the use of pure tin and defines the finish as part of the part number in the Military Specification.
- 3: Parts that define the plating finish in their procurement specification, but do not specifically prohibit the use of a pure tin finish.
- 4: Parts that define the lead finish as other than pure tin in the procurement specification, but allow the use of a pure tin finish as part of the process. The manufacturer may have a pure tin finish plating that is used on some product. Having this capability as part

of the manufacturing process generates a risk that the non-tin plated parts could receive the wrong process.

- 5: Parts that do not specify the lead finish or specifically prohibit the use of pure tin as a finish.

All of the above risks are reduced on the TDRSS IV Transponder program by the following Purchase Order (PO) note that was imposed by the program Material Supplier Quality Requirements document.

PROJECT NOTE NO./REV	CATEGORY NUMBER	NO. OF VARIABLES	NOTE TEXT
391 A, 6/92	<u>5</u> PO/RECVR	0	The use of pure (unalloyed) tin finish is prohibited on all surfaces. This includes leads that are subsequently hot solder dipped unless dipped all the way to the body.
<p>This note is for use by projects that are either contractually required or choose to ban the use of pure tin (electroplated, fused or hot dipped) altogether. ***The project QATM and RPE are responsible for reviewing their parts lists for applicability of this note to specific parts. ***The QATM is responsible for adding this note against the applicable parts in the MSQR. *** The project team is also required to evaluate and make documented decisions when parts with "NO TIN" are not readily available to meet the project needs.</p>			

## B.2 Requirement Summary

A summary of the tin plating requirements for each of the component types is delineated in the following tables.

### Nuts, Bolts & Washers

Type	Mil-Specification or Motorla Drawing	Tin plating prohibited	Finish specified	Details in paragraph	Risk
NUT	MS35649	No	Yes	B.3.41	3
NUT	NAS671	No	Yes	B.3.42	3
BOLT	03-P40020E	No	Yes	B.3.43	3
SCREW	MS24693	No	Yes	B.3.44	3
SCREW	MS51957	No	Yes	B.3.45	3
SCREW	MS51958	No	Yes	B.3.46	3
SCREW	NAS662	No	Yes	B.3.47	3
WASHER	NAS620	No	Yes	B.3.48	3

### Frames, Covers, Housings, Blocks & Panels

Type	Mil-Specification or Motorola Drawing	Tin plating prohibited	Finish specified	Details in paragraph	Risk
COVER	15-P40023E	No	Yes	B.3.1	3
COVER	15-P40038E	No	Yes	B.3.2	3
COVER	15-P40039E	No	Yes	B.3.3	3
HOUSING	15-P40050E	No	Yes	B.3.4	3
COVER	15-P40051E	No	Yes	B.3.5	3
COVER	15-P40052E	No	Yes	B.3.6	3
COVER	15-P40071E	No	Yes	B.3.7	3
COVER	15-P40091E	No	Yes	B.3.8	3
COVER	15-P40131E	No	Yes	B.3.9	3
COVER	15-P40151E	No	Yes	B.3.10	3
BLOCK	46-P40072E	No	Yes	B.3.25	3
BLOCK	46-P40152E	No	Yes	B.3.26	3
PANEL	64-P40022E	No	Yes	B.3.27	3
FRAME	07-P40073E	No	Yes	B.3.11	3
FRAME	07-P40090E	No	Yes	B.3.12	3
FRAME	07-P40110E	No	Yes	B.3.13	3
FRAME	07-P40130E	No	Yes	B.3.14	3
FRAME	07-P40143E	No	Yes	B.3.15	3
FRAME	07-P40150E	No	Yes	B.3.16	3
FRAME	07-P45529E	No	Yes	B.3.17	3

**Adhesives & Paints**

Type	Mil-Specification or Motorola Drawing	Tin plating prohibited	Finish specified	Details in paragraph	Risk
ALL	VARIOUS	No	No	B.3.55 – B.3.68	*1

**Wire, Cables, Foil, Terminal Strips & Coils**

Type	Mil-Specification Or Motorola Drawing	Tin plating prohibited	Finish specified	Details in paragraph	Risk
Terminal strip	29-P40037E	No	Yes	B.3.18	3
Wire, magnet	30-P34069D	No	Yes	B.3.19	3
Foil	30-P34073D	No	Yes	B.3.20	3
Coaxial cable	30-P40035E	No	Yes	B.2.21	3
Wire	M22759 M80822	No	Yes	B.3.22	3
Coil	74-P16553A	No	Yes	B.3.28	3
Coil	74-P32317M	No	Yes	B.3.29	3

**PWBs, Insulation & Gaskets**

Type	Mil-Specification Or Motorola Drawing	Tin plating prohibited	Finish specified	Details in paragraph	Risk
Gasket	1004-2561-1215	No	Yes	B.3.23	3
Insulation Sleeving	M23053	No	No	B.3.24	*1
PWB	84-P40027E	No	Yes	B.3.30	3
CIP	84-P40034A	No	Yes	B.3.31	4
CIP	84-P40034A	No	Yes	B.3.32	4
PWB	84-P40042E	No	Yes	B.3.33	3
PWB	84-P40045E	No	Yes	B.3.34	3
PWB	84-P40082E	No	Yes	B.3.35	3
PWB	84-P40102E	No	Yes	B.3.36	3
PWB	84-P40122E	No	Yes	B.3.37	3
PWB	84-P40142E	No	Yes	B.3.38	3
PWB	84-P40202E	No	Yes	B.3.39	3
PWB	84-P45527E	No	Yes	B.3.40	3
Insulator	14-P40053E001	No	No	B.3.69	**1

\*As required quantities. Items do not have a finish.

\*\* No finish on item.

**Solders**

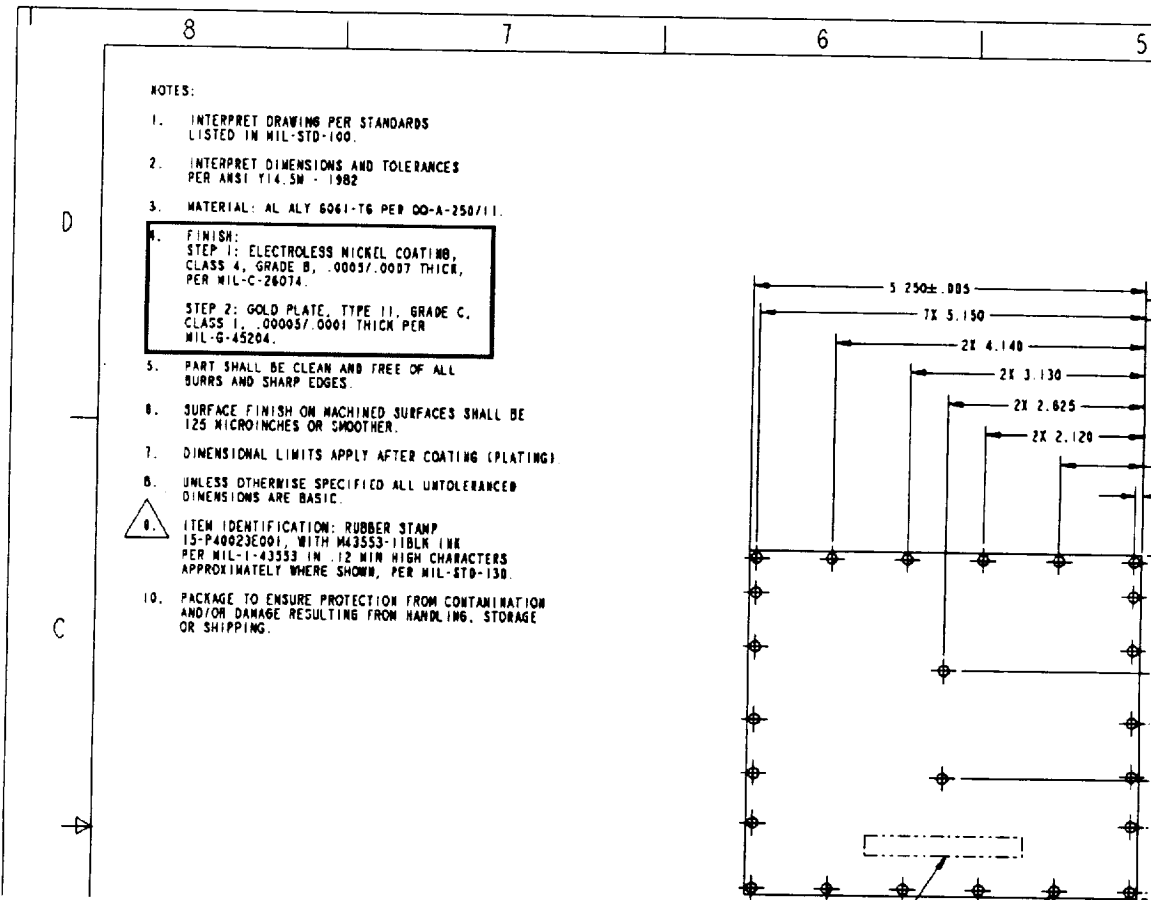
Type	Mil-Specification or Motorola Drawing	Tin plating prohibited	Finish specified	Details in paragraph	Risk
ALL	VARIOUS	No	No	B.3.49 – B.3.54	3

### B.3 Material Finish Mechanical Parts

The material finish requirements for each of the applicable part numbers/specifications is shown in the following paragraphs

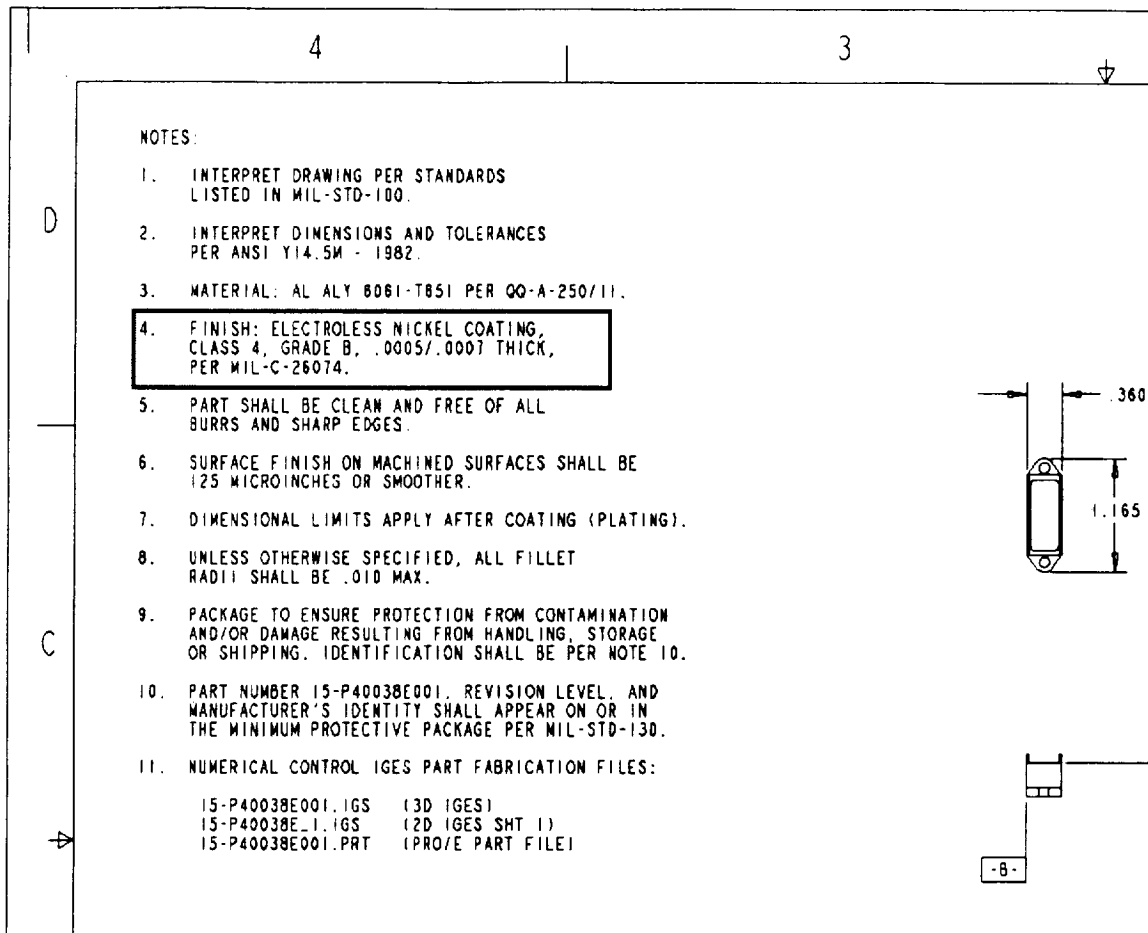
#### B.3.1 Cover, Wireway Xpndr, 15-P40023E001

The finish required by the following Motorola drawing (15-P40023E) is electroless nickel and gold.



## B.3.2 Cover, Programming, 15-P40038E001

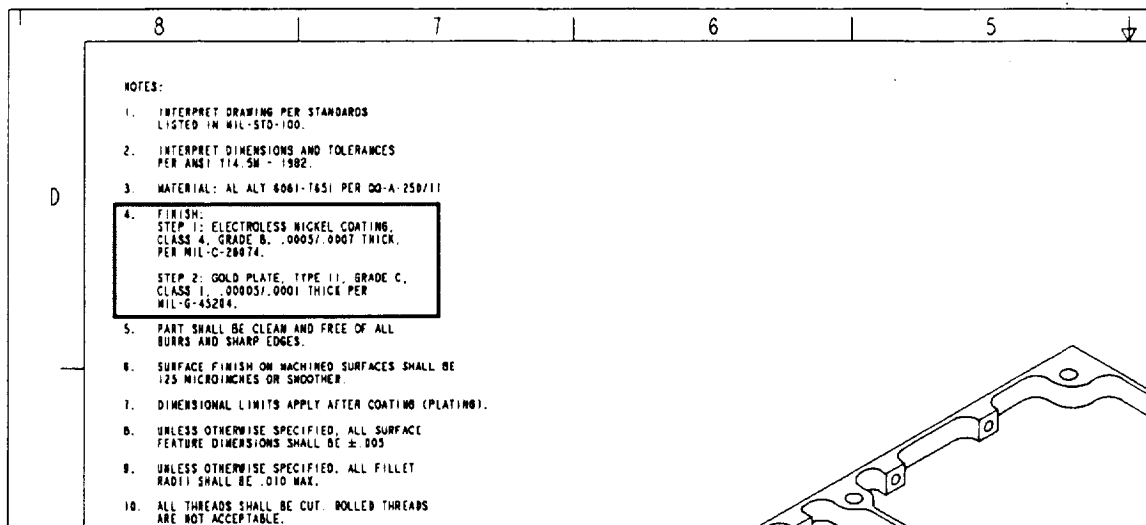
The finish required by the following Motorola drawing (15-P40038E) is electroless nickel.





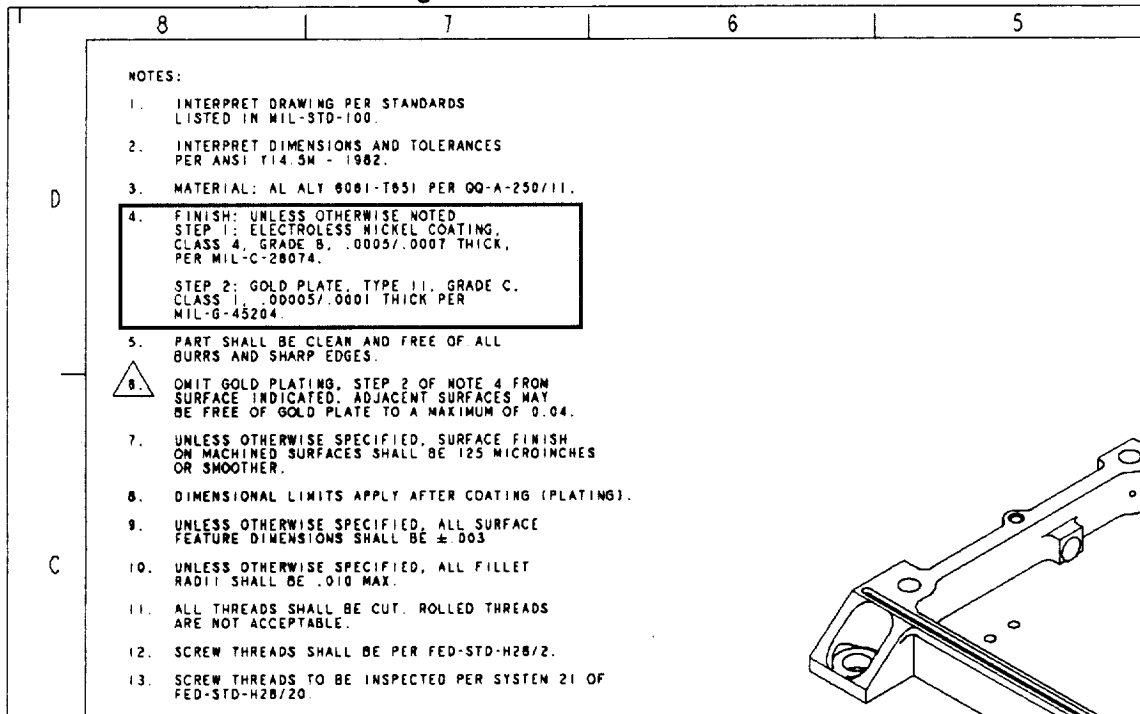
## B.3.3 Cover, Top, 15-P40039E001

The finish required by the following Motorola drawing (15-P40039E) is electroless nickel and gold.



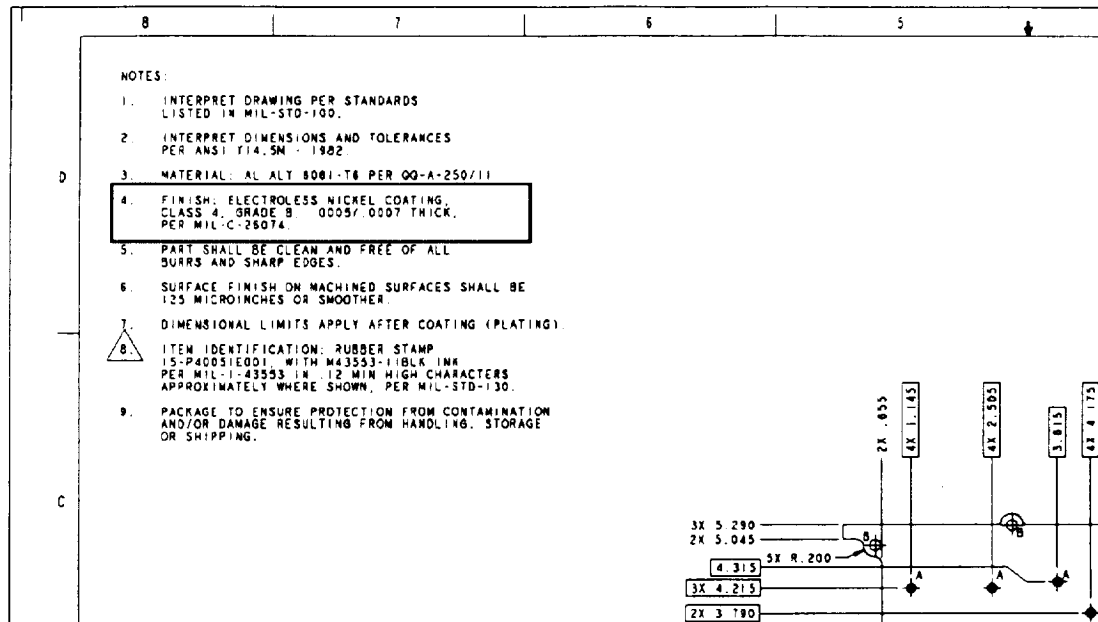
## B.3.4 Housing, Power Amplifier, 15-P40050E001

The finish required by the following Motorola drawing (15-P40050E) is electroless nickel and gold.



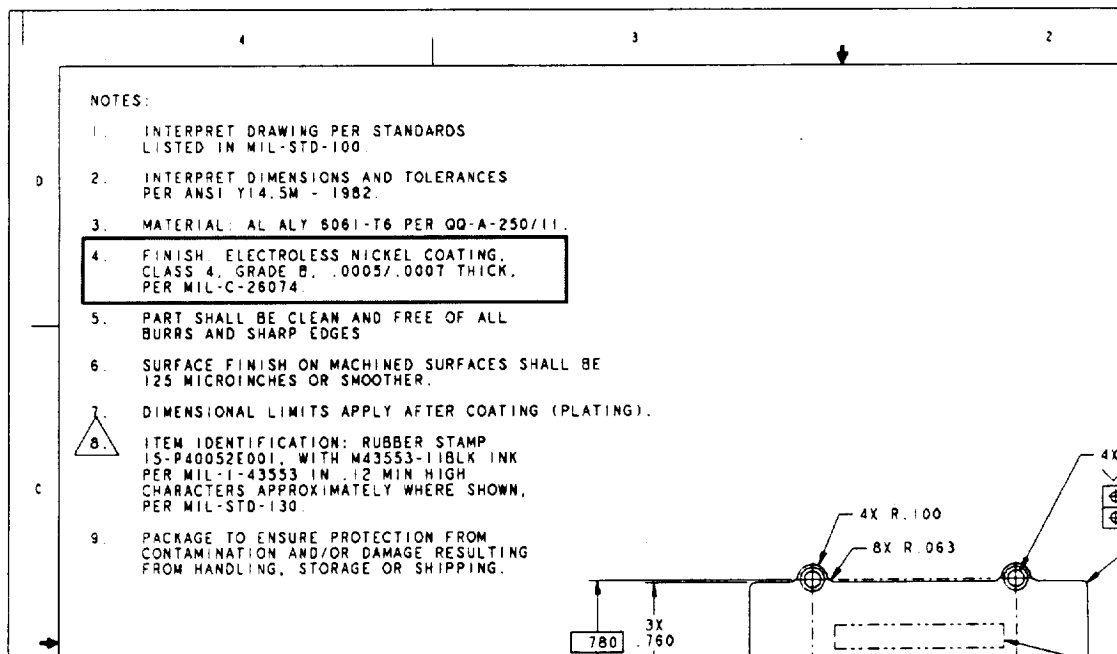
## B.3.5 Cover, Power Amplifier, 15-P40051E001

The finish required by the following Motorola drawing (15-P40051E) is electroless nickel.



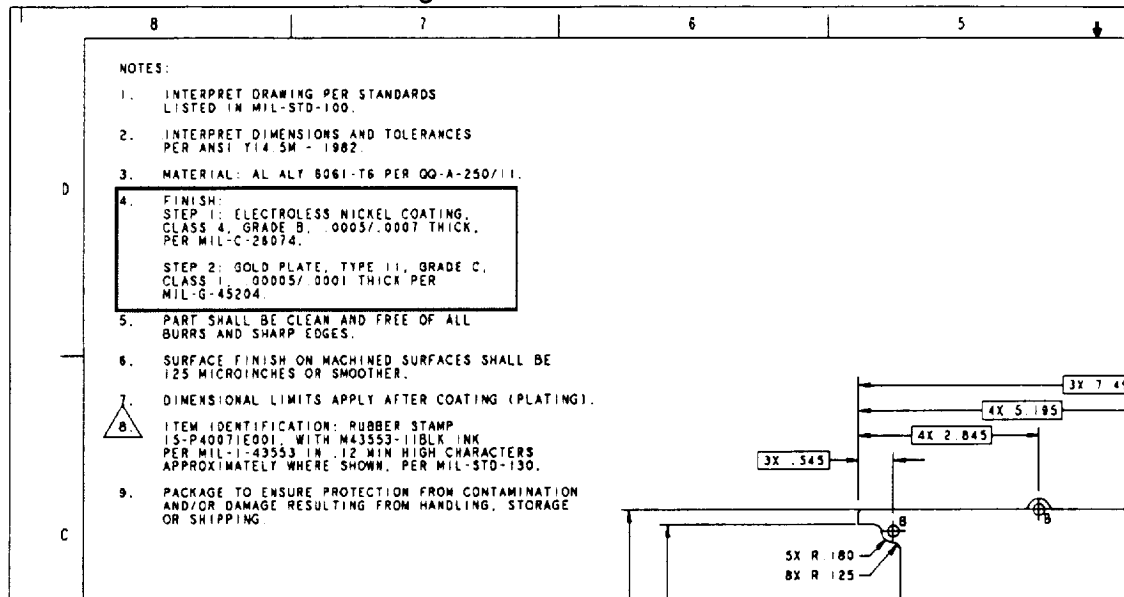
## B.3.6 Cover, Wireway, 15-P40052E001

The finish required by the following Motorola drawing (15-P40052E) is electroless nickel.



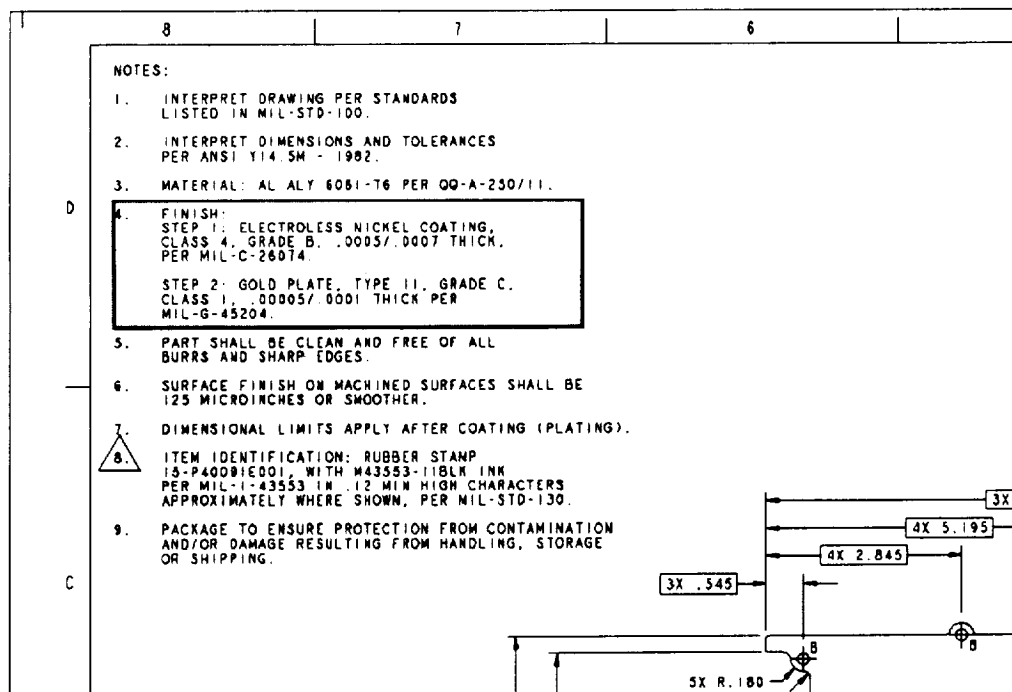
## B.3.7 Cover, Digital Processor, 15-P40071E001

The finish required by the following Motorola drawing (15-P40071E) is electroless nickel and gold.



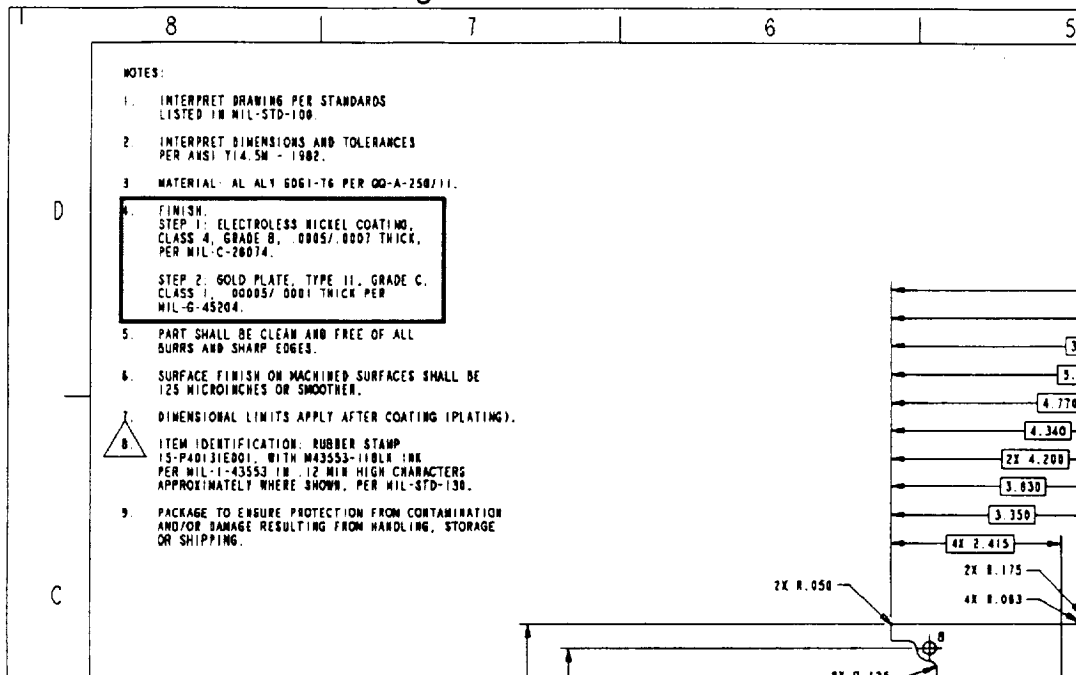
## B.3.8 Cover, Xmtr Power, 15-P40091E001

The finish required by the following Motorola drawing (15-P40091E) is electroless nickel and gold.



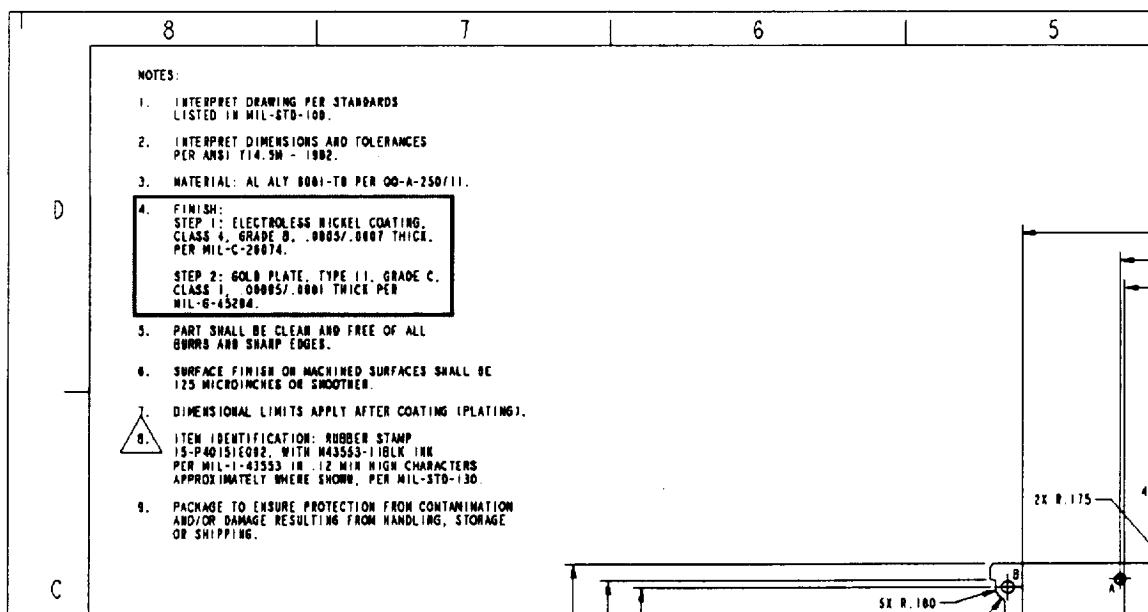
## B.3.9 Cover, Upconverter, 15-P40131E001

The finish required by the following Motorola drawing (15-P40131E) is electroless nickel and gold.



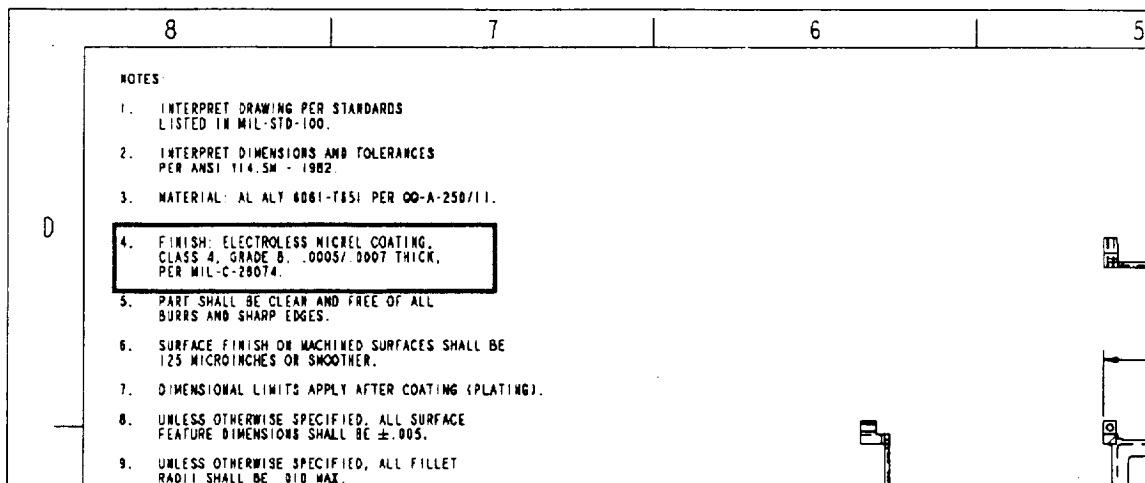
## B.3.10 Cover, Receiver RF, 15-P40151E002

The finish required by the following Motorola drawing (15-P40151E) is electroless nickel and gold.



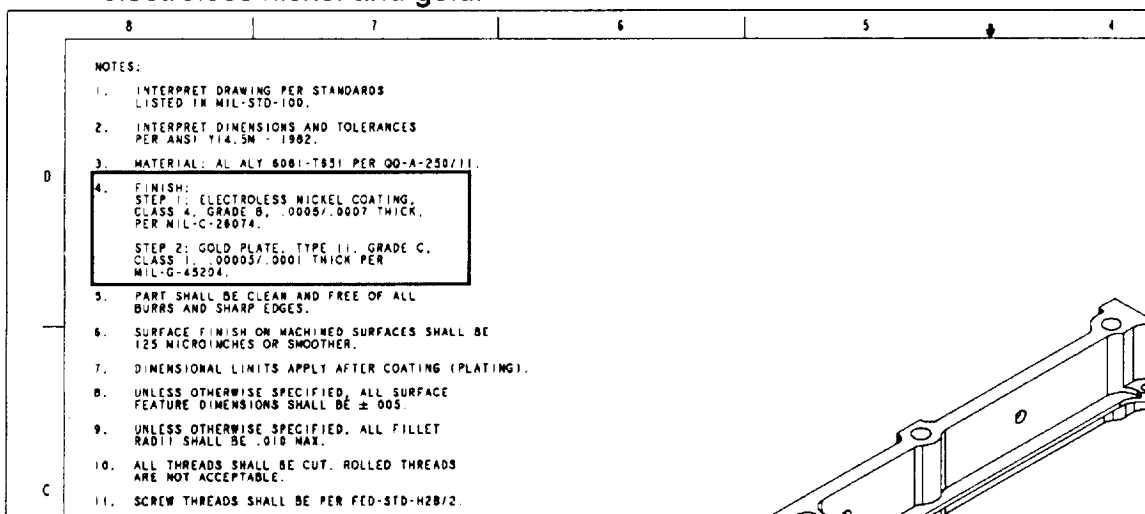
## B.3.11 Frame, ESN Component, 07-P40073E001

The finish required by the following Motorola drawing (07-P40073E) is electroless nickel.



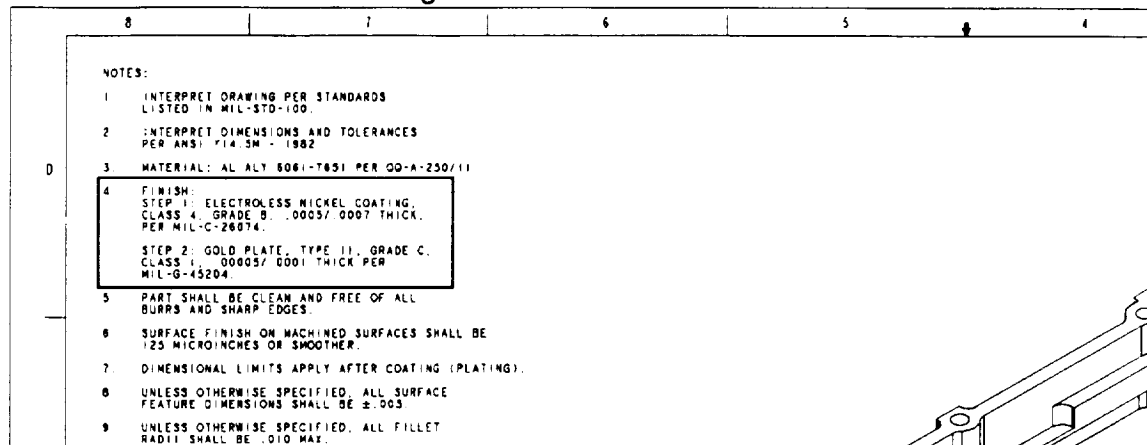
## B.3.12 Frame, Xmtr PC, 07-P40090E001

The finish required by the following Motorola drawing (07-P40090E) is electroless nickel and gold.



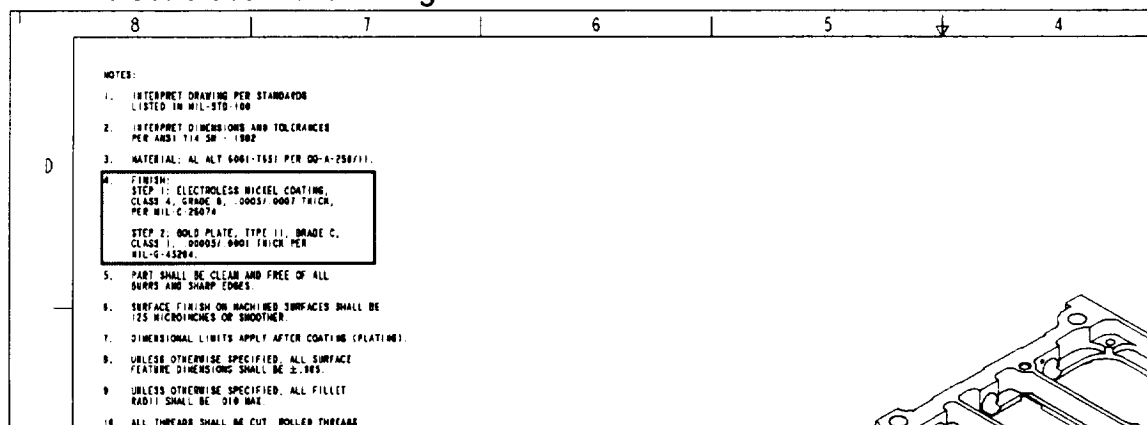
## B.3.13 Frame, RCVR Power, 07-P40110E001

The finish required by the following Motorola drawing (07-P40110E) is electroless nickel and gold.



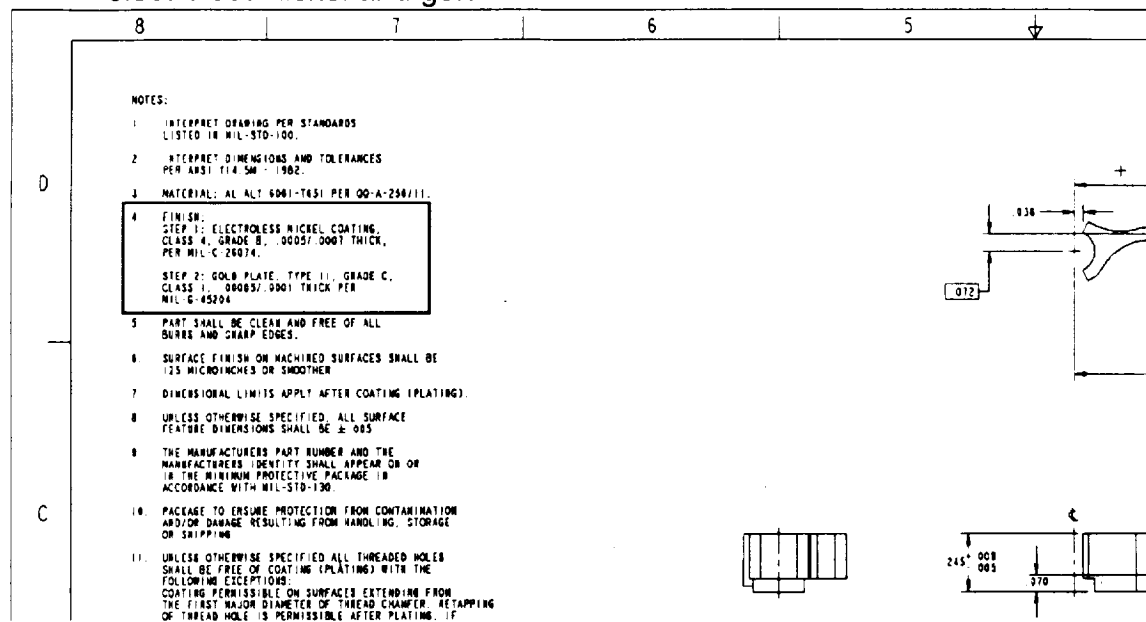
## B.3.14 Frame, Upconverter, 07-P40130E001

The finish required by the following Motorola drawing (07-P40130E) is electroless nickel and gold.



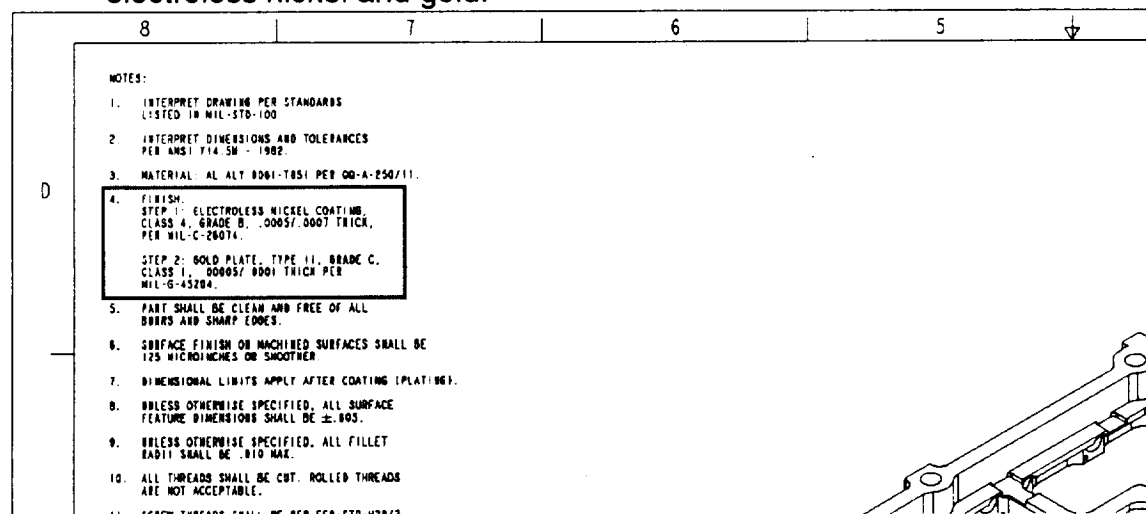
## B.3.15 Bracket, Receiver RF, 07-P40143E001

The finish required by the following Motorola drawing (07-P40143E) is electroless nickel and gold.



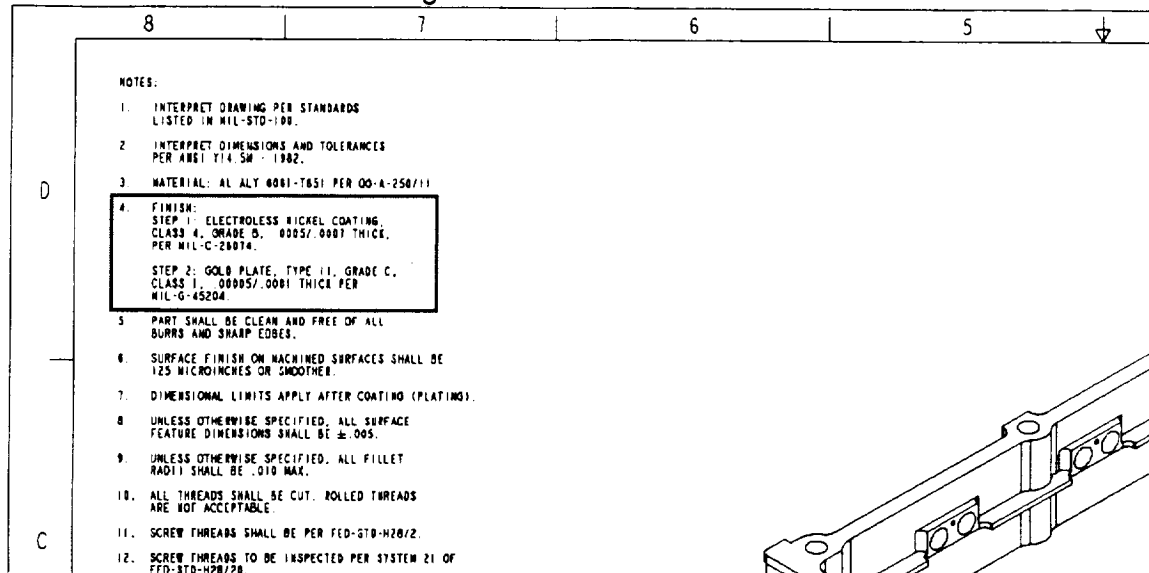
## B.3.16 Frame, Receiver RF, 07-P40150E001

The finish required by the following Motorola drawing (07-P40150E) is electroless nickel and gold.



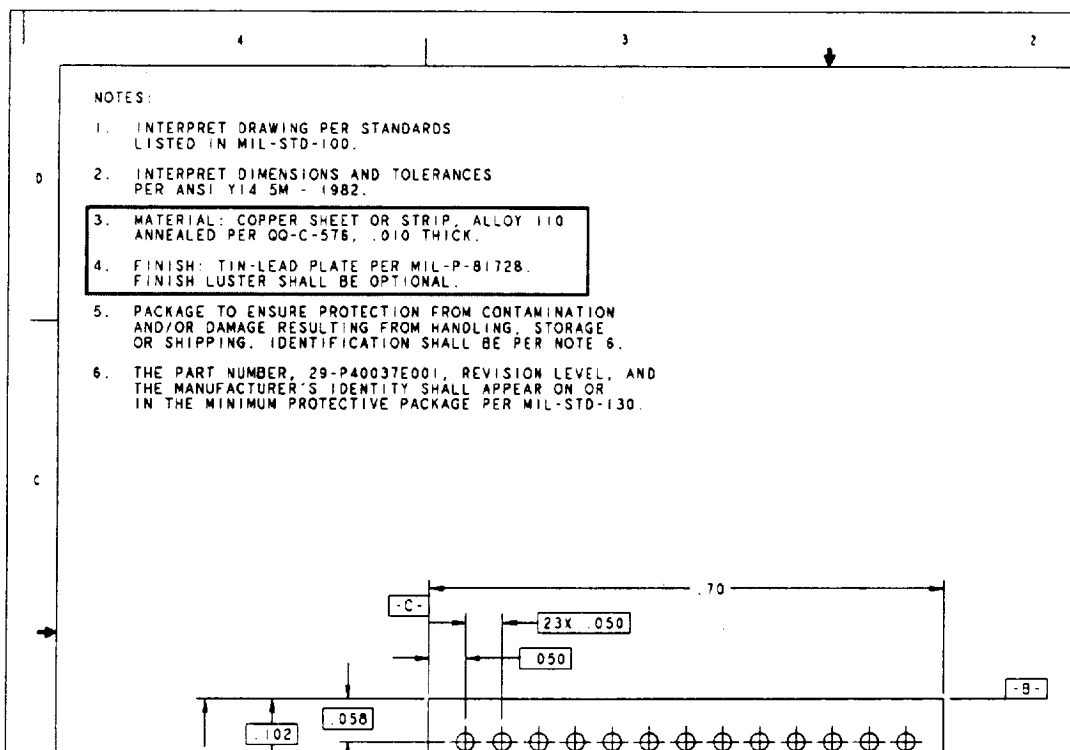
### B.3.17 Frame, Digital Processor, 07-P45529E001

The finish required by the following Motorola drawing (07-P45529E001) is electroless nickel and gold.



### B.3 18 Terminal Strip, 29-P40037E001

The finish required by the following Motorola drawing (29-P40037E) is tin-lead plating per MIL-P-81728.





## B.3.19 Wire, Magnet, 30-P34069D126A, -130A, -132A, -134A, -634A

The WIRE, ELEC-MAGNET is procured in accordance with MOTOROLA INC. drawing number 30-P34069D, MAGNET WIRE, SINGLE CONDUCTOR AND BIFILAR, ROUND, MATERIAL REQUIREMENTS FOR. MOTOROLA INC. Drawing number 30-P34069D defines the material properties of the wire in the following paragraph, 3.1.

*"3.1 MATERIAL PROPERTIES*

*THE MATERIAL PROPERTIES SHALL BE IN ACCORDANCE WITH J-W-1177/9, /10, /39, /40, /42 EXCEPT THAT THE MATERIAL SHALL BE THE COLORS SHOWN IN TABLES I AND II."*

J-W-1177 requires the following conductor core materials:

*1.3.3 Conductor code. A single alpha character shall indicate the conductor material.*

*c - Copper*

*A - Aluminum*

*N - Nickel-coated copper*

*S - Silver-coated copper*

J-W-1177B L1 ■■■ 777774 0001170 2 ■■

J-W-1177B

1.2.3.1 Intermediate sizes. Wire sizes between AWG sizes or having dimensions not listed in the applicable specification sheets may be specified. These products shall meet the dimensional requirements defined in 3.4.

1.3 Part number. Part number shall be of the following form as specified (see 6.2.1).

P1177/XX (see 1.3.1) 02 (see 1.3.2) C (see 1.3.3) 021 (see 1.3.4) R (see 1.3.5)

1.3.1 Federal specification number. The federal specification sheet number designation consists of a prefix F which indicates a federal specification item, the specification number, and the specification sheet.

1.3.2 Class and type. The type of insulation consists of a two digit code. The type will be defined on the specification sheet.

00 - Type SU	Class (Temp rating)	105 degrees Celsius (°C)
01 - Type SN	Class (Temp rating)	105°C
02 - Type T	Class (Temp rating)	105°C
03 - Type TN	Class (Temp rating)	105°C
04 - Type TB	Class (Temp rating)	105°C
05 - Type SUM	Class (Temp rating)	105°C

1.3.3 Conductor code. A single alpha character shall indicate the conductor material.

C - Copper

A - Aluminum

N - Nickel-coated copper

S - Silver-coated copper

1.3.4 Conductor size. A three digit code shall indicate the AWG size of a round conductor and the dimensions in inches of a rectangular wire.

The elec-magnet wire is coated in accordance with the following paragraph from J-W-1177:

*1.3.2 Class and type. The type of insulation consists of a two digit codes  
The type will be defined on the specificationsheet.*

*00 - Type SU Class (Temp rating) 105 degrees Celsius (°C)*

*01 - Type SN Class (Temp rating) 105°C*

*02 - Type T Class (Temp rating) 105°C*

*03 - Type TN Class (Temp rating) 105°C*

*04 - Type TB Class (Temp rating) 105°C*

*05 - Type SUN Class (Temp rating) 105°C*

Both ends of the wire are stripped and solder coated with SN62WRP3 solder prior to installation into the module.

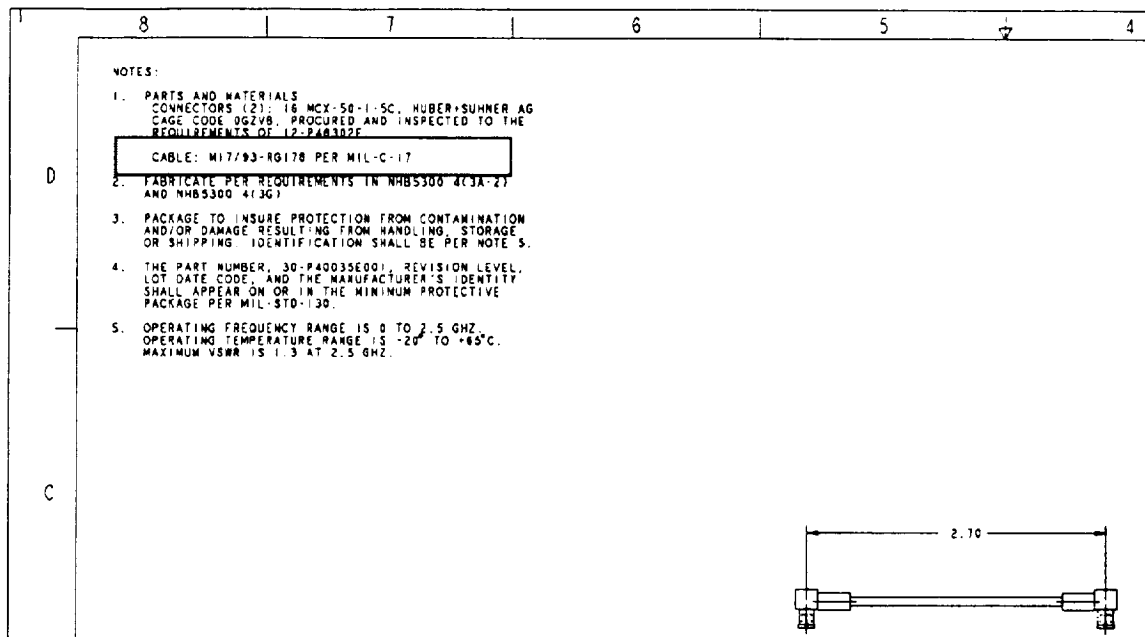
### B.3.20 Foil, copper, 30-P34073D001

The finish required by the following Motorola drawing (30-P34073D) is fused tin-lead or equivalent.

3.	REQUIREMENTS
3.1	MATERIAL
3.1.1	MATERIAL MATERIAL SHALL BE ELECTROLYTIC TOUGH PITCH HOT-ROLLED, SOFT-ANNEALED COPPER FOIL ASTM B152. THICKNESS OF THE 30-P34073D001 MATERIAL SHALL BE 0.001 INCH BEFORE PLATING. THICKNESS OF THE 30-P34073D002 SHALL BE 0.005 INCH BEFORE PLATING.
3.1.2	PLATING PLATING SHALL BE 60/40 TIN-LEAD (FUSED OR EQUIVALENT) IN ACCORDANCE WITH MIL-P-81728. THICKNESS SHALL BE 0.00002 INCH MINIMUM/0.0003 INCH MAXIMUM FOR EACH SIDE.
3.2	QUALIFICATION AND QUALITY CONFORMANCE INSPECTION
3.2.1	QUALIFICATION THE MATERIAL FURNISHED UNDER THIS DOCUMENT SHALL HAVE BEEN QUALIFIED BY TESTING IN ACCORDANCE WITH SECTION 4 OF ASTM B 152 AND IN ACCORDANCE WITH SECTION 4 OF THIS DOCUMENT. QUALIFIED MATERIALS ARE LISTED IN SECTION 7. REQUALIFICATION SHALL BE REQUIRED IN THE FOLLOWING CASES: A. CHANGE IN MATERIAL FORMULATION. B. CHANGE IN SUPPLIER MANUFACTURING METHODS THAT COULD AFFECT THE PROPERTIES OF THE QUALIFIED MATERIAL.
3.2.2	QUALITY CONFORMANCE INSPECTION THE MANUFACTURER SHALL PERFORM THE QUALITY CONFORMANCE INSPECTION OF ASTM B 152. UNLESS OTHERWISE SPECIFIED BY THE
	<div> <div>SIZE A</div> <div>CAGE CODE 94990</div> <div>DWG NO 30-P34073D</div> <div>REV D</div> </div> <div> <div>SCALE: NONE</div> <div>SHEET 3</div> </div>

## B.3.21 Coaxial Cable Assembly, RF, 30-P40035E001

The finish required for the connectors is discussed in the electrical tin plating requirement study. The cable material is required by Motorola drawing (30-P40035E) to be per MIL-C-17.



MIL-C-17 requires the following based on the part number:

3.5 Design and construction. Unless otherwise specified (see 3.1), cables shall be of the design and construction specified herein.

3.5.1 Inner conductors. The inner conductor shall be solid, stranded, braided or helical, bare or coated, as specified (see 3.1). The materials and coatings shall be as specified (see 3.1).

3.5.1.1 Solid inner conductors:

- a. Bare copper wire. Bare copper wire shall conform to soft or annealed copper wire in accordance with ASTM B-3.
- b. Tin-coated copper wire. Tin-coated copper wire shall conform to tin-coated, soft or annealed copper wire in accordance with ASTM B-33.
- c. Silver-coated copper wire. Silver-coated copper wire shall conform to ASTM B-298, except thickness of silver coating shall not be less than 40 microinches.
- d. Copper-clad steel wire. Copper-clad steel wire shall conform to high-strength, 40 percent conductivity, hard-drawn, copper-clad, steel wire in accordance with ASTM B-452, class 40HS.
- e. Annealed copper-clad steel wire. Annealed copper-clad steel wire shall have the same requirements as for copper-clad steel wire specified in 3.5.1.1(d), except shall be annealed. The tensile strength shall be 50,000 lbf/in<sup>2</sup> minimum.
- f. Silver-coated copper-clad steel wire. Silver-coated copper-clad steel wire shall conform to ASTM B-501, class 40 HS or 40A, except thickness of silver coating shall not be less than 40 microinches.
- g. Annealed copper-clad aluminum wire. Annealed copper-clad aluminum wire shall conform to ASTM B-566, class 10A or 15A. The thickness of the copper covering shall be 3.5 percent minimum of the wire radius (8 to 12 percent by volume) for class 10A, and 5 percent minimum of the wire radius (13 to 17 percent by volume) for class 15A.
- h. Copper-beryllium alloy wire. Copper-beryllium alloy wire shall conform to solution-heat-treated, half-hard wire in accordance with ASTM B-197, Alloy 172. The tensile strength shall be 110,000 to 135,000 lbf/in<sup>2</sup>.

## B.3.22 Wire, M22759/44-26-9, M81822/13-A26-9, M81822/13-A30-9

M22759/44 calls for use of silver coated wire:

MIL-W-22759E SUPP 1 61 ■ 9999906 0470186 5 ■

MIL-W-22759E  
SUPPLEMENT 1

MIL-W-22759/43C - Wire, Electrical, Fluoropolymer-Insulated, Cross-linked Modified ETFE, Normal Weight, Silver-Coated Copper, 200°C, 600-Volt

MIL-W-22759/44A - Wire, Electrical, Fluoropolymer-Insulated, Cross-linked Modified ETFE, Light Weight, Silver-Coated Copper, 200°C, 600-Volt

MIL-W-22759/45A - Wire, Electrical, Fluoropolymer-Insulated, Cross-linked Modified ETFE, Light Weight, Nickel-Coated Copper, 200°C, 600-Volt

M22759 silver coated requirement:

MIL-W-22759E 61 ■ 9999906 0468032 1 ■

MIL-W-22759E

3.4.1.2 Silver-coated copper strands. The strands shall have a coating thickness of not less than 40 micro-inches of silver when tested in accordance with ASTM B 298.

M81822/13 calls for silver-coated copper conductors:

MIL-W-81822A SUPP 1 61 ■ 9999906 0094964 9 ■

MIL-W-81822A  
SUPPLEMENT 1

SPECIFICATION SHEETS (Continued)

MIL-W-81822/9	Cancelled. 3 March 1982
MIL-W-81822/10	Wire, Electrical, Solderless Wrap, Uninsulated, Silver Coated Solid Conductor
MIL-W-81822/11	Wire, Electrical, Solderless Wrap, Uninsulated, Gold Coated Solid Conductor
MIL-W-81822/12	Wire, Electrical, Solderless Wrap, Uninsulated, Tin Coated Solid Conductor.
MIL-W-81822/13	Wire, Electrical, Solderless Wrap, Extruded Ethylene-Tetrafluoroethylene (ETFE) Insulation, Silver Coated Solid Conductor.
MIL-W-81822/14	Cancelled. 20 September 1977

M81822 silver coated requirement:

MIL-W-81822A 61 ■ 9999906 0094964 8 ■

MIL-W-81822A

3.3.1.2 Conductor coating. The conductor coating shall be tin, silver, or gold as specified in the applicable military specification sheet. The coating shall be in accordance with ASTM B 33 for tin coating, ASTM B 298 for silver coating, or MIL-G-45204, type I, grade A, class 1 for gold coating, except that the requirement of MIL-G-45204 for completion of all mechanical operations before plating shall not apply (i.e., wires may be drawn after plating). Silver coatings shall be a minimum of 40 microinches thick, when determined in accordance with ASTM B 298.

ASTM B298 silver-coating requirement:

purchase order for direct procurement by agencies of the U.S. Government (see S1, S2, and S3).

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sociated  
standards  
prior to  
1.2 and

**4. Materials and Manufacture**

**4.1** The material shall be silver-coated copper wire (Explanatory Note 2), of such quality and purity that the finished product shall have the properties and characteristics prescribed in this specification.

**NOTE 1**—The following specifications define copper suitable for use: Specifications B 4 and B 5.

it at the  
re extent

**4.2** Copper of special qualities, forms, or types, as may be agreed upon between the manufacturer and the purchaser, and that will conform to the requirements prescribed in this specification may also be used.

## B.3.23 Gasket, 1004-2561-1215

Gasket PN is a Chomerics part number:

Table 3 *continued*

O-STRIPS			
Chomerics P/N* MIL P/N: M83528/ 001X† -( )	Nominal Dimension [Dia.]	"Rule of Thumb" Groove Dimensions <sup>11</sup>	
		Depth	Width
10-04-2561-XXXX (003)	0.062 (1.57)	0.049 (1.24)	0.077 (1.96)
10-04-1087-XXXX (004)	0.070 (1.78)	0.058 (1.42)	0.084 (2.13)
19-04-12987-XXXX (NA)	0.074 (1.88)	0.060 (1.52)	0.087 (2.21)
19-04-11228-XXXX (NA)	0.075 (1.91)	0.061 (1.55)	0.087 (2.21)
19-04-12899-XXXX (NA)	0.077 (1.96)	0.063 (1.60)	0.089 (2.26)
19-04-12900-XXXX (NA)	0.079 (2.01)	0.064 (1.63)	0.091 (2.31)
10-04-2657-XXXX (005)	0.080 (2.03)	0.065 (1.65)	0.092 (2.34)

\* Last four digits should be used to designate material (1215, 1217, 1285, etc.). Smallest sizes may not be extrudable in certain materials. For explanation of superscript codes following XXXX, which indicates non-availability, refer to page 39.

† "X" should be replaced by applicable MIL-G-83528B material type (e.g., A, B, C, etc.). Number in parentheses is MIL-G-83528B dash number, which should be inserted (without parentheses) at end of MIL P/N.

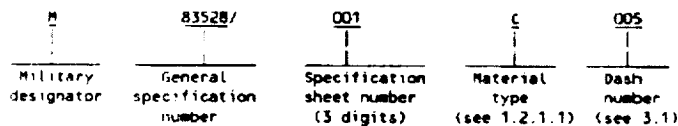
*continued next page*

Tel: 781-935-4850 Fax: 781-933-4318  
Tel: (44) 1628 404000 Fax: (44) 1628 404090  
[www.chomerics.com](http://www.chomerics.com)



Per M83528, there are no pure tin finishes:

1.2.1 Part or Identifying Number (PIN). The PIN shall be as shown in the following example:



1.2.1.1 Material type.

- A Silver-plated, copper-filled silicone capable of 110 dB of plane wave shielding effectiveness at 10 GHz with a continuous use temperature range of -55°C to +125°C.
- B Silver-plated, aluminum-filled silicone capable of 100 dB of plane wave shielding effectiveness at 10 GHz with a continuous use temperature range of -55°C to +160°C.
- C Silver-plated, copper-filled fluorosilicone capable of 110 dB of plane wave shielding effectiveness at 10 GHz with a continuous use temperature range of -55°C to +125°C and resistant to solvents and jet fuels.
- D Silver-plated, aluminum-filled fluorosilicone capable of 90 dB of plane wave shielding effectiveness at 10 GHz, with a continuous use temperature range of -55°C to +160°C, and resistant to solvents and jet fuels.
- E A medium durometer, pure silver-filled silicone capable of 110 dB of plane wave shielding effectiveness at 10 GHz with a continuous use temperature range of -55°C to +160°C.

## B.3.24 Insulation, sleeving, M23053/18-101-C, M23053/18-102-C

Insulation sleeving does not have a finish.

MIL-I-23053/18A 59 ■ 9999906 0438983 3 ■

(INCH-POUND)  
MIL-I-23053/18A  
31 May 1990  
SUPERSEDING  
MIL-I-23053/18  
5 August 1988

MILITARY SPECIFICATION SHEET

INSULATION SLEEVING, ELECTRICAL, HEAT SHRINKABLE,  
MODIFIED FLUOROPOLYMER, CROSSLINKED

This specification is approved for use by all  
Departments and Agencies of the Department of Defense.

The complete requirements for acquiring the sleeving described herein shall consist of this Specification Sheet and the issue of the following specification listed in that issue of the Department of Defense Index of Specifications and Standards (DODISS) specified in the solicitation: MIL-I-23053.

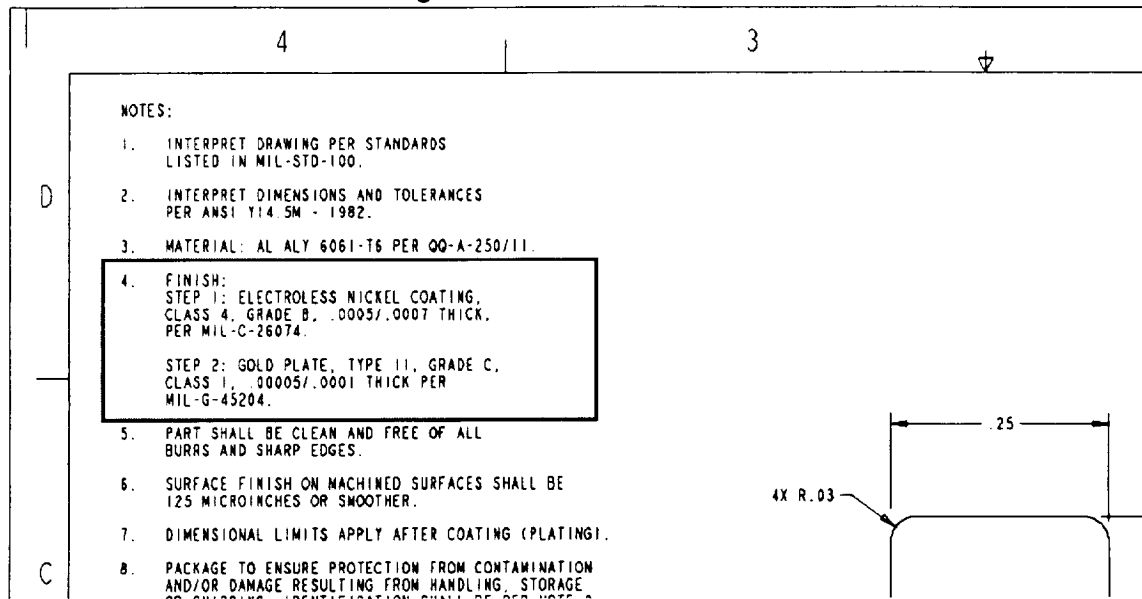
## B.3.25 Block, spacer, 46-P40072E001

The finish required by the following Motorola drawing (46-P40072E) is electroless nickel and gold.

	4	3	2				
D	<p>NOTES:</p> <ol style="list-style-type: none"> <li>1. INTERPRET DRAWING PER STANDARDS LISTED IN MIL-STD-100.</li> <li>2. INTERPRET DIMENSIONS AND TOLERANCES PER ANSI Y14.5M - 1982.</li> <li>3. MATERIAL: MOLYBDENUM PER MIL-M-27524</li> <li>4. FINISH: STEP 1: NICKEL PLATE PER QQ-N-280, CLASS 1, GRADE G, .0001 MIN THICK. STEP 2: GOLD PLATE, TYPE III, GRADE A, CLASS 1, .00005/ .0001 THICK PER MIL-G-45204.</li> <li>5. PART SHALL BE CLEAN AND FREE OF ALL BURRS AND SHARP EDGES.</li> <li>6. SURFACE FINISH ON MACHINED SURFACES SHALL BE 125 MICROINCHES OR SMOOTHER.</li> <li>7. PACKAGE TO ENSURE PROTECTION FROM CONTAMINATION AND/OR DAMAGE RESULTING FROM HANDLING, STORAGE OR SHIPPING IDENTIFICATION SHALL BE PER NOTE 8.</li> <li>8. THE PART NUMBER, 46-P40072E001, REVISION LEVEL, AND THE MANUFACTURER'S IDENTITY SHALL APPEAR ON OR IN THE MINIMUM PROTECTIVE PACKAGE PER MIL-STD-130.</li> </ol>						
	<table border="1"> <tr> <td>REV</td> <td>DESCRIPTION</td> </tr> <tr> <td>A</td> <td>SEE MCO 844338</td> </tr> </table>				REV	DESCRIPTION	A
REV	DESCRIPTION						
A	SEE MCO 844338						
C							

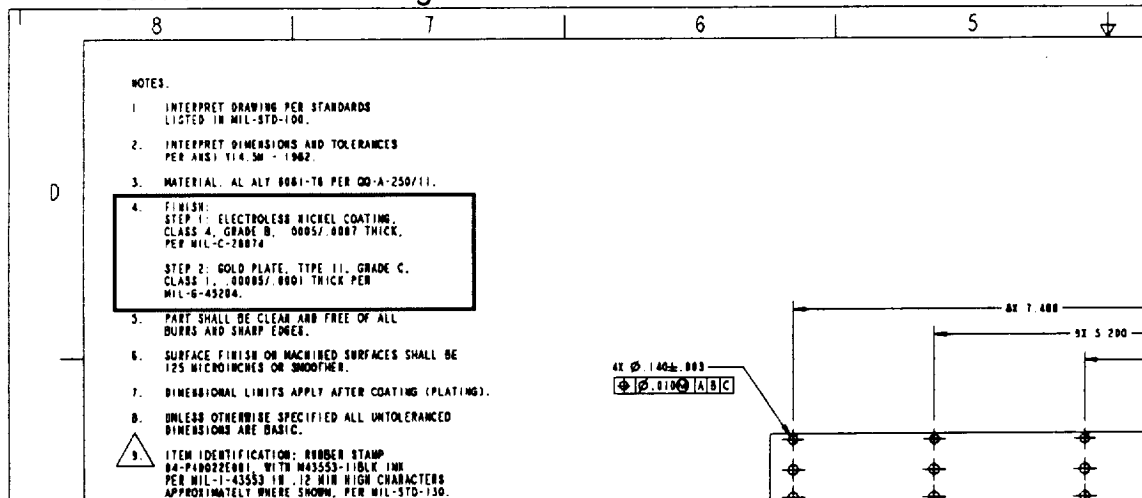
## B.3.26 Block, spacer, 46-P40152E001

The finish required by the following Motorola drawing (46-P40152E) is electroless nickel and gold.



## B.3.27 Shear panel, transponder 64-P40022E001

The finish required by the following Motorola drawing (64-P40022E) is electroless nickel and gold.





**B.3.28 Form, coil – toroidal 74-P16553A027, 74-P16553A033, 74-P16553A077**

The coil form material is defined in MOTOROLA INC. drawing 74-P16553A. The materials used for the coil forms are variants of the following materials:

Phenolic  
Carbonyl  
Synthetic Oxide

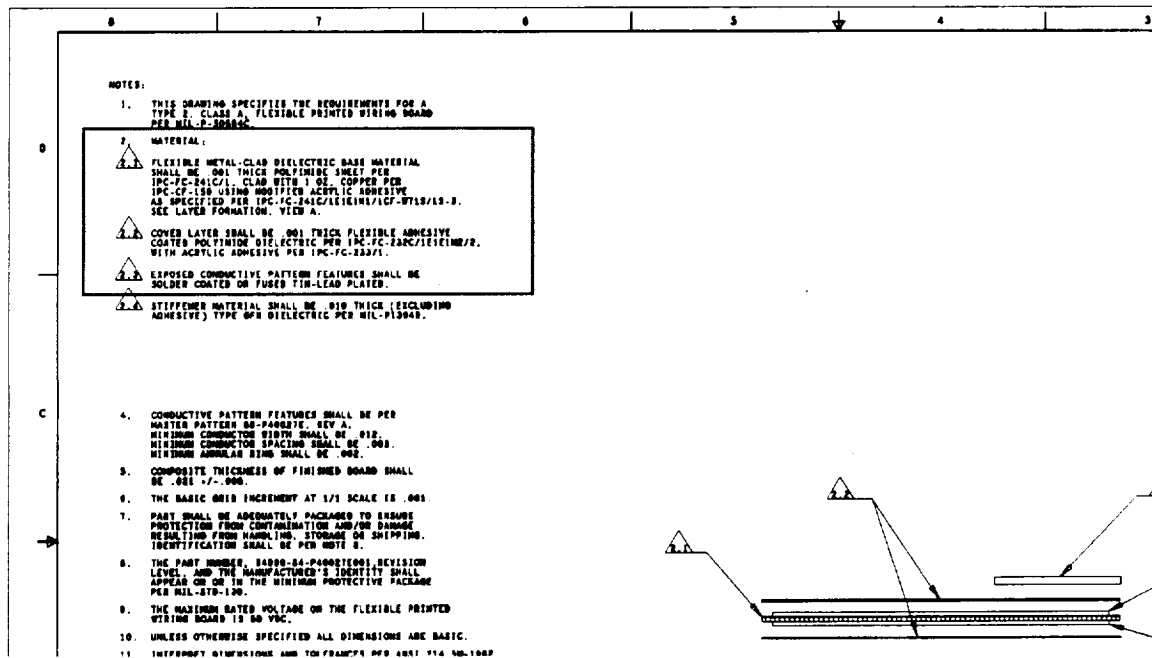
The coil forms are coated with Paryene C or Polyurethane Spray depending upon the size of the coil. There are no tin materials or tin finishes used in the coil forms.

**B.3.29 Form, coil – toroidal 74-P32317M001, 74-P32317M002**

The Coil from with two hole bead is made of Ferrite. The Ferrite is not coated. There are no tin materials or tin finishes used in the coil forms.

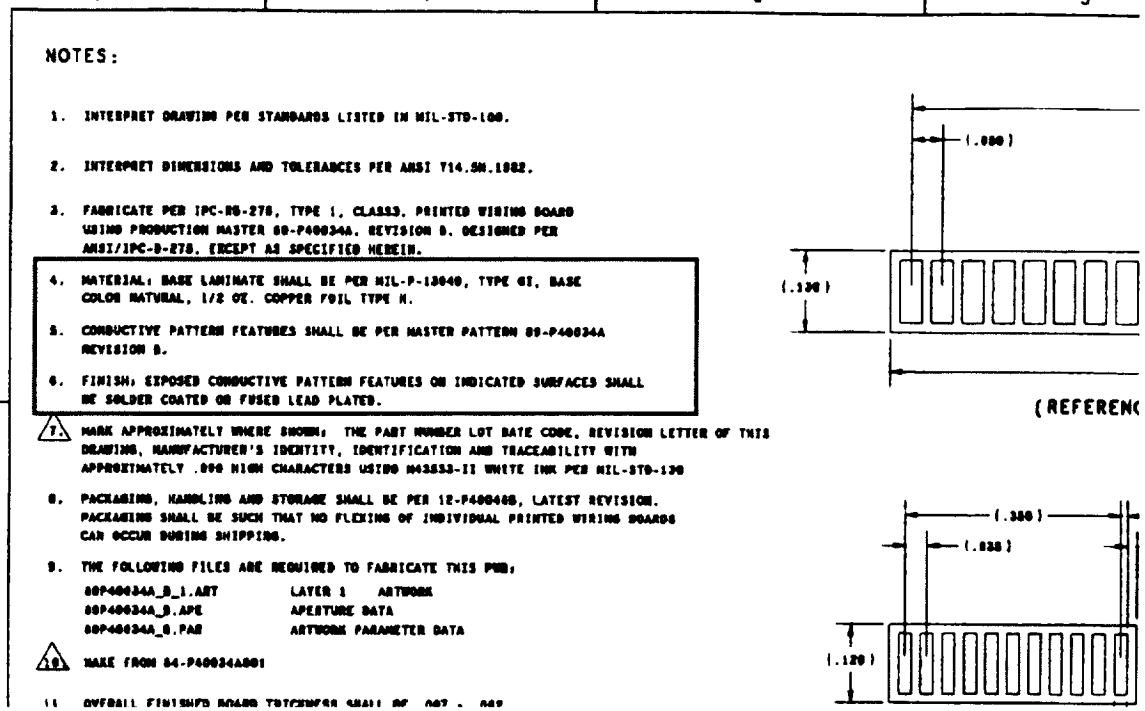
**B.3.30 PWB, flexible 84-P40027E001**

The material and finish required by the following Motorola drawing (84-P40027E) is polyimide, copper and tin-lead plating.



## B.3.31 Circuit Interrupt Pad, 84-P40034A007

The material and finish required by the following Motorola drawing (84-P40034A) is G1, copper, and fused tin plating.

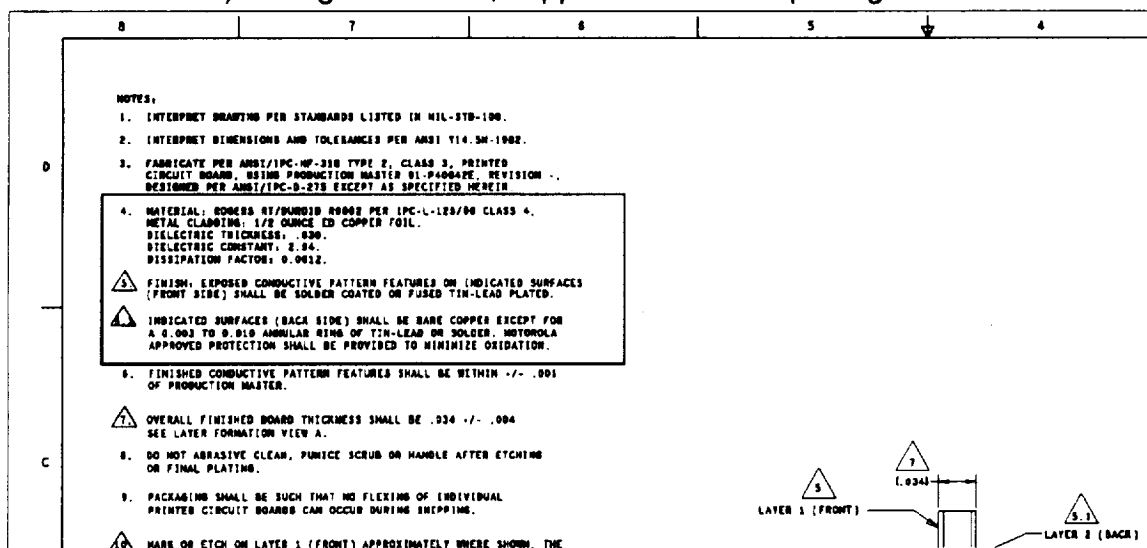


## B.3.32 Circuit Interrupt Pad, 84-P40034A050

(same as B.3.31)

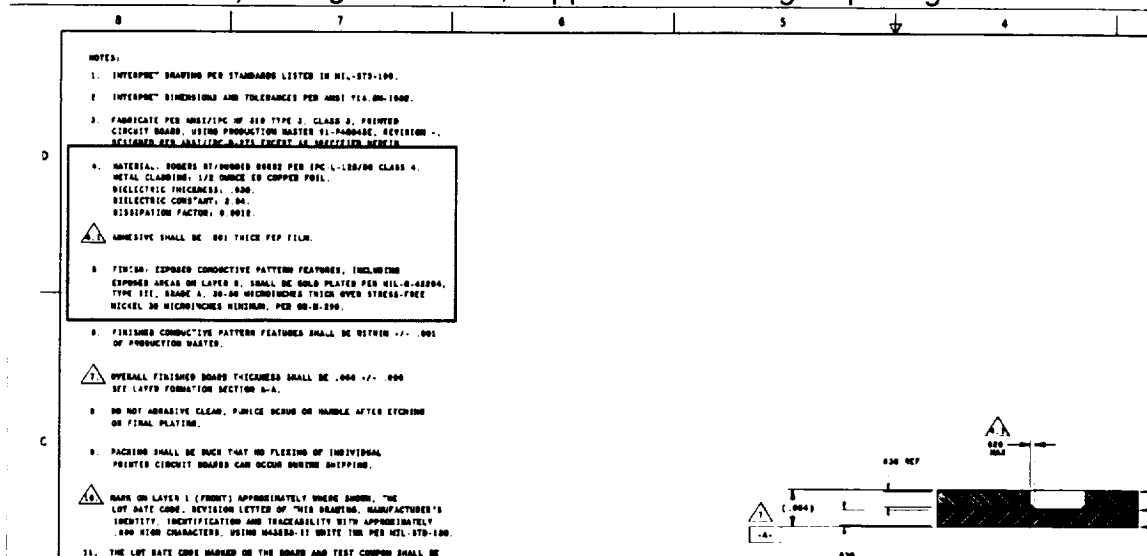
## B.3.33 Printed Circuit Board, 84-P40042E001

The material and finish required by the following Motorola drawing (84-P40042E) is Roger's Duroid, copper and tin-lead plating.



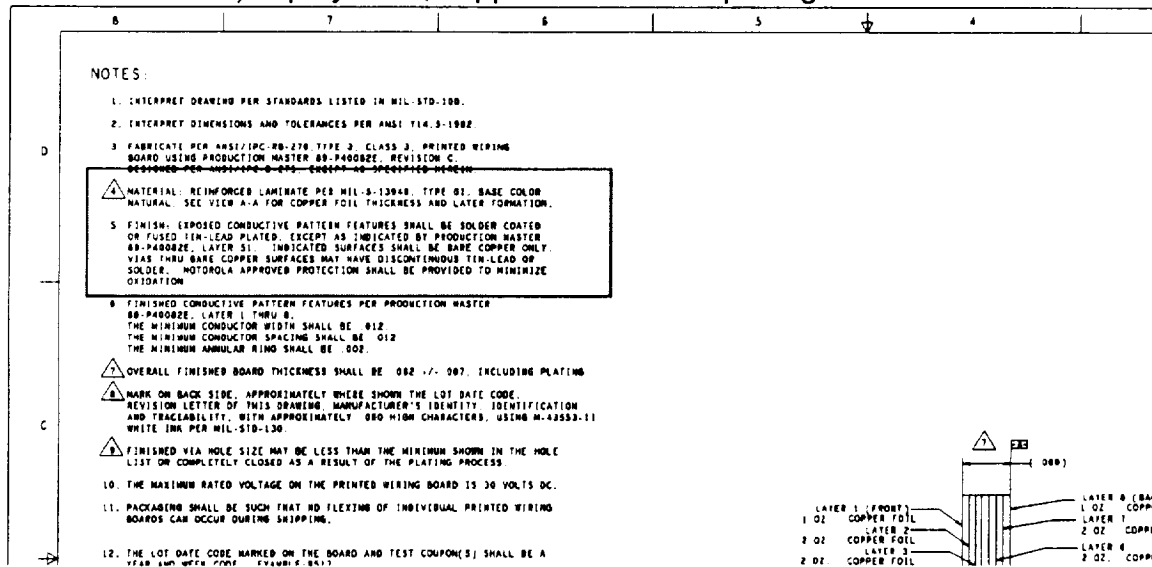
### B.3.34 Printed Circuit Board, 84-P40045E001

The material and finish required by the following Motorola drawing (84-P40045E) is Roger's Duroid, copper and nickel-gold plating.



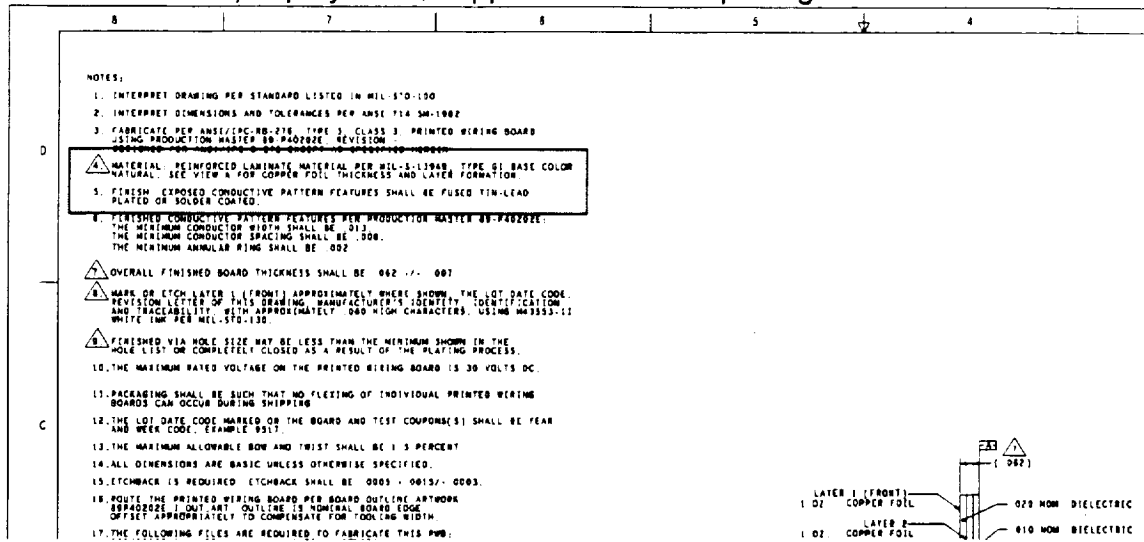
**B.3.35 PWB, Xmtr power converter 84-P40082E001**

The material and finish required by the following Motorola drawing (84-P40082E) is polyimide, copper and tin-lead plating.



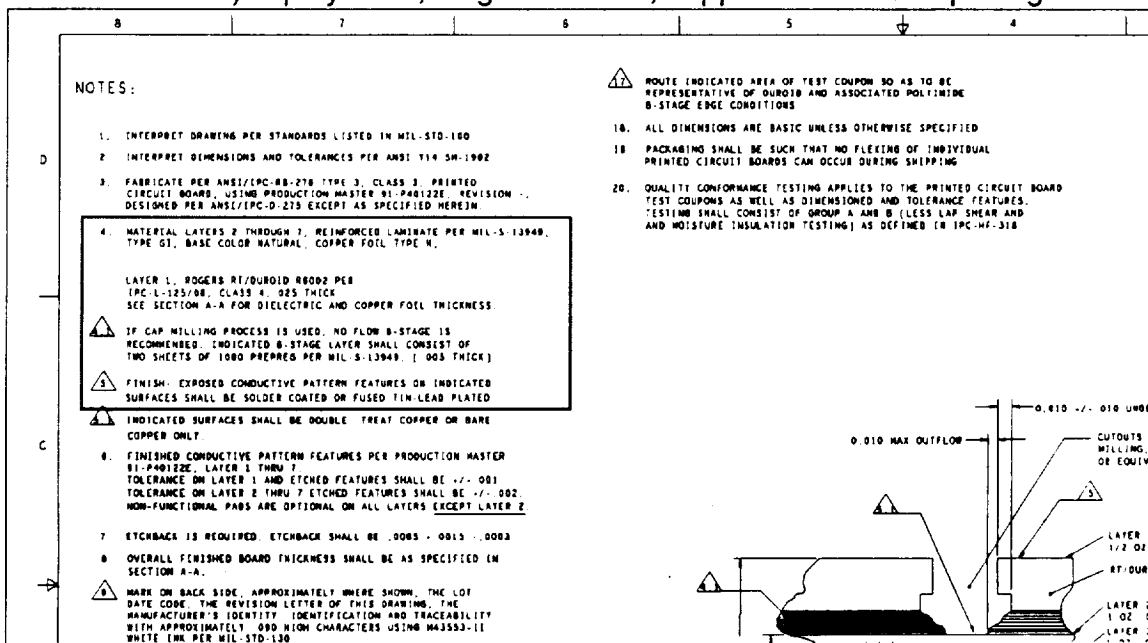
## B.3.36 Printed wiring board 84-P40102E001

The material and finish required by the following Motorola drawing (84-P40102E) is polyimide, copper and tin-lead plating.



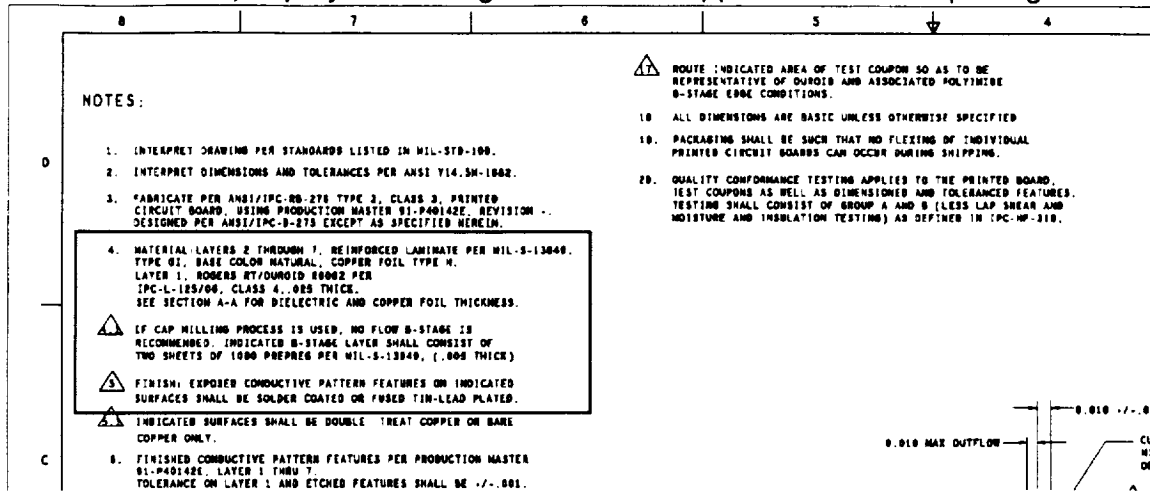
## B.3.37 Printed circuit board 84-P40122E001

The material and finish required by the following Motorola drawing (84-P40122E) is polyimide, Roger's Duroid, copper and tin-lead plating.



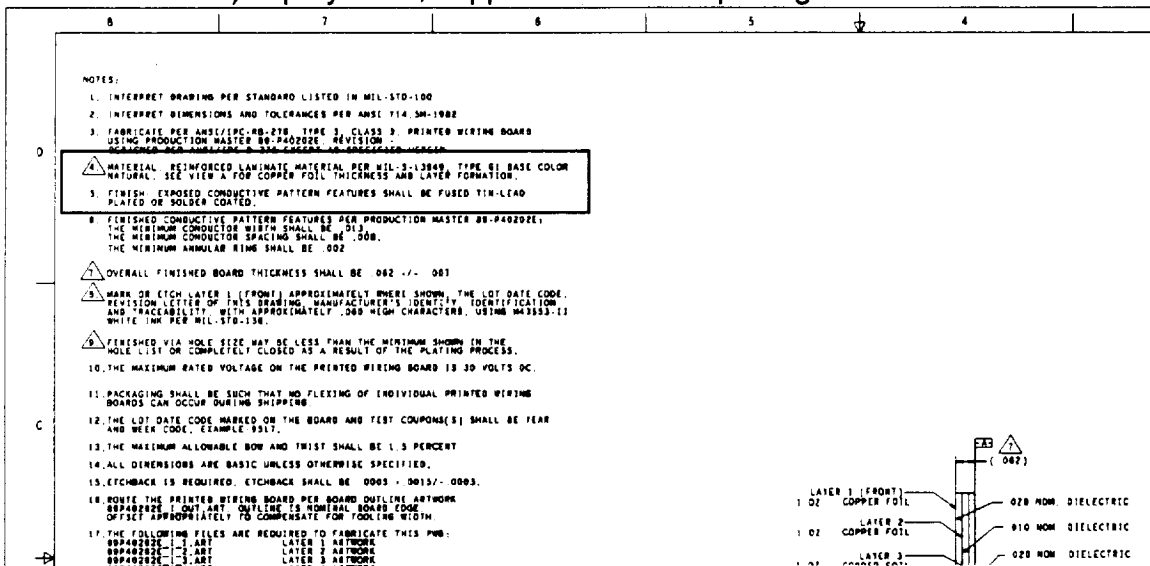
**B.3.38 Printed circuit board 84-P40142E001**

The material and finish required by the following Motorola drawing (84-P40142E) is polyimide, Roger's Duroid, copper and tin-lead plating.



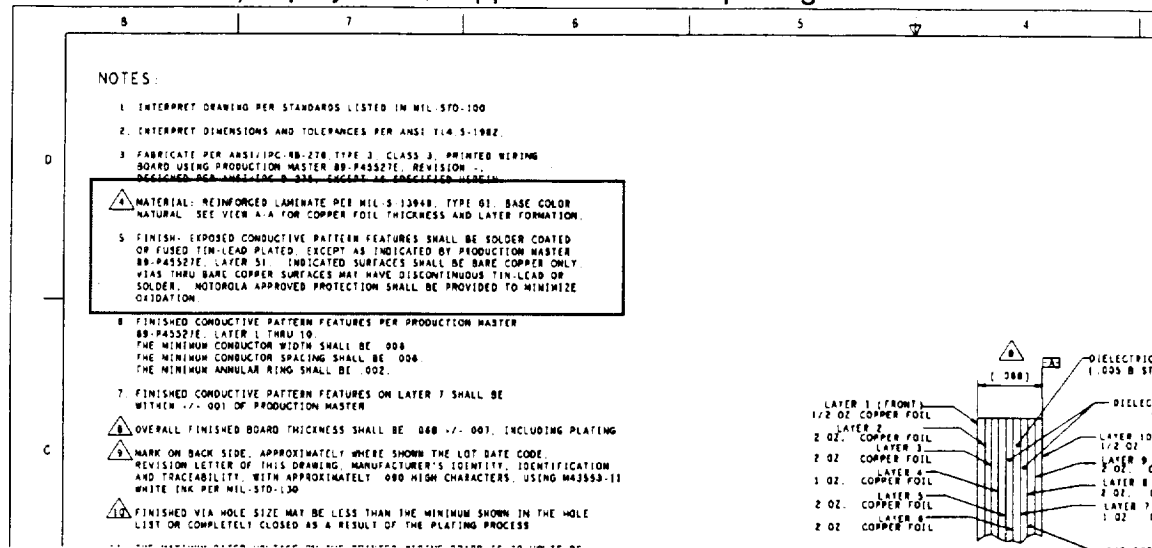
### B.3.39 PWB, TCXO assembly 84-P40202E001

The material and finish required by the following Motorola drawing (84-P40202E) is polyimide, copper and tin-lead plating.



## B.3.40 PWB Digital processor 84-P45527E001

The material and finish required by the following Motorola drawing (84-P45527E) is polyimide, copper and tin-lead plating.



## B.3.41 Nut MS35649-244

The material and finish required by MS35649 is stainless steel with a passivation finish or black oxide.

**REQUIREMENTS:**

1. **MATERIAL:** Austenitic Corrosion-Resistant Steel screws shall be manufactured from Type 302 (UNS S30200), Type 304 (UNS S30400), Type 304L (UNS S30403), Type 305 (UNS S30500), Type 316 (UNS S31600), Type 316L (UNS S31603), Type 384 (UNS S38400), or Type XM-7 (UNS S30430) in accordance with chemical composition specified in QQ-S-763. (See Material Identification Marking and Material Code).
2. **FINISH:** Passivate in accordance with QQ-P-35 or Black Oxide coating (except for Type 316 or Type 316L) in accordance with MIL-C-13924, Class 4. (See Finish Code).
3. **MECHANICAL PROPERTIES:** The minimum tensile strength in load pounds, indicated for each size in Table I, is based on 80,000 PSI Minimum Tensile Strength. Load pounds are calculated by the stress areas indicated in FED-STD-H28/2. The yield strength, based on .2 percent offset, shall be 30,000 psi minimum.

## B.3.42 Nut NAS671C0, NAS671C2, NAS671C4

The material and finish required by NAS671 is stainless steel with a passivation finish or black oxide.

THIS DRAWING SUPERSEDES ALL ANTECEDENT STANDARD DRAWINGS FOR THE SAME PRODUCT AND SHALL BECOME EFFECTIVE NO LATER THAN SIX MONTHS FROM THE LAST DATE OF APPROVAL SHOWN HEREON.

-4	.1120-40 UNJC-3B	.188	.189	.217	.167	.066	.057
-6	.1380-32 UNJC-3B	.250	.241	.289	.228	.098	.087
-8	.1640-32 UNJC-3B	.313	.302	.361	.282	.114	.102
-10	.1900-32 UNJF-3B	.344	.332	.398	.310	.130	.117

**MATERIAL:** Carbon steel, 55 ksi uts minimum. The sulphur or phosphorous content shall not be greater than 0.050 by weight. Optional materials: 12L14 (UNS G12144) per ASTM A108 and 11L37 (UNS G11374) per AMS 5020.  
 Steel, Cres. 303 (UNS S30300) per ASTM A582  
 Brass, C462 Alloy (UNS C46200) per QQ-P-462-  
 Brass, Per ASTM B21 (UNS C46200) or ASTM B124 (UNS C46400)

**FINISH:** Steel, Carbon, Cadmium Plate per QQ-P-416, Type II, Class 2.  
 Steel, Cres, Passivate per QQ-P-35.  
 Brass, Cadmium Plate per QQ-P-416, Type II, Class 2.

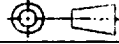
**CODE:** Letter "B" between basic number and dash number indicates Brass Cadmium Plated.  
 Letter "C" between basic number and dash number indicates Cres.

**EXAMPLE OF**

**PART NUMBER:** NAS671-3 Steel Cad Plated Nut  
 NAS671B3 Brass Cad Plated Nut  
 NAS671C3 Cres Nut

**THREADS:** Threads shall be in accordance with MIL-S-8879.

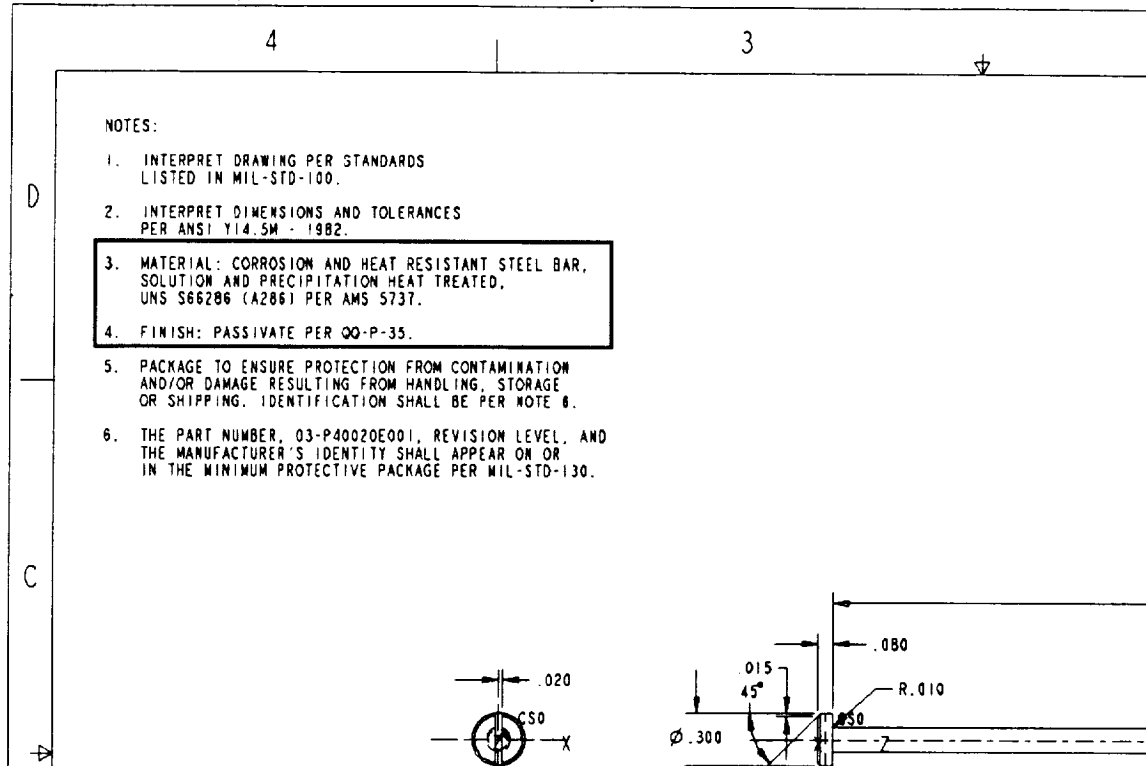
- NOTES:**
1. Nuts shall be free of all burrs and slivers which might become dislodged under usage.
  2. Dimensions in inches unless otherwise specified.
  3. ~~Class 2 Cadmium Plating acceptable until 15 March 1977.~~
  4. ~~Class 2B Threads per MIL-S-8879 acceptable until 15 March 1977.~~
  5. This standard takes precedence over documents referenced herein.

CUSTODIAN	NATIONAL AEROSPACE STANDARDS COMMITTEE	THIRD ANGLE PROJECTION	
PROCUREMENT SPECIFICATION	TITLE NUT, PLAIN, HEXAGON - SMALL PATTERN, NONSTRUCTURAL	CLASSIFICATION STANDARD PART	
FF-N-836		NAS 671	

APPROVAL DATE: Sept. 1955 REVISION: ① 31 Jan. 1962 ② 15 March 1975 ③ 8 June 1981 ④ 23 JUNE

## B.3.43 Bolt, stack xpndr 03-P40020E001

The material and finish required by the following Motorola drawing (03-P40020E) is stainless steel with a passivated finish.





## B.3.44 Screw MS24693-C2

The material and finish required by MS24693 is stainless steel with a passivation finish or black oxide.

<p><b>REQUIREMENTS:</b></p> <p>1. <b>MATERIAL:</b> ALUMINUM ALLOY PER QQ-A-225/6, BRASS PER ASTM B16, ASTM B36, ASTM B134 OR ASTM B206 COPPER-SILICON ALLOY PER ASTM B98 OR ASTM B39, UNS C65110, UNS C85500 OR UNS C94100, NICKLE-COPPER ALLOY PER QQ-M-281, TYPE A (UNS N04400), CARBON STEEL PER FED-STD-66, CORROSION RESISTANT STEEL PER FED-STD-66, COMPOSITION 302, 303, 304, 308 OR 316 OR EQUAL TO OR INTERCHANGEABLE WITH 16-18 OR 18-8 CHROMIUM-NICKLE ALLOY STEEL (DEVELOPED FOR COLD HEADING).</p> <p>2. <b>PROTECTIVE COATING, PLATING OR TREATMENT:</b> ANODIZE IN ACCORDANCE WITH MIL-A-8625, TYPE I OR II, CLASS 1, BLACK CHEMICAL FINISH IN ACCORDANCE WITH MIL-F-495, BLACK OXIDE COATING IN ACCORDANCE WITH MIL-C-13924, CADMIUM PLATE IN ACCORDANCE WITH QQ-P-416, TYPE II, CLASS 3, NICKLE PLATE IN ACCORDANCE WITH QQ-M-290, CLASS 1, GRADE E, CLEAN AND DESCALE IN ACCORDANCE WITH ASTM A380.</p> <p>3. <b>MAGNETIC PERMEABILITY:</b> CORROSION RESISTANT STEEL SCREWS SHALL HAVE A MAGNETIC PERMEABILITY IN ACCORDANCE WITH THE PROCUREMENT SPECIFICATION.</p> <p>4. <b>HEAT TREATMENT:</b> ALUMINUM ALLOY SCREWS, 62 KSI MINIMUM ULTIMATE TENSILE STRENGTH IN ACCORDANCE WITH MIL-H-6088.</p> <p>5. <b>RECESS:</b> THE RECESS SHALL BE IN ACCORDANCE WITH MS9906.</p> <p>6. <b>THREADS:</b> THREADS SHALL BE CLASS 2A IN ACCORDANCE WITH FED-STD-H2B/2. ACCEPTABILITY OF SCREW THREADS SHALL BE IN ACCORDANCE WITH FED-STD-H2B/20, SYSTEM 21.</p> <p>7. <b>THREAD LENGTH:</b> FOR SCREWS UP TO AND INCLUDING 2.000 INCHES IN LENGTH, THE COMPLETE THREADS SHALL EXTEND TO WITHIN TWO (2) THREADS OF THE BEARING SURFACE OF THE HEAD, OR CLOSER IF PRACTICABLE. SCREWS OF LONGER LENGTH SHALL HAVE A MINIMUM COMPLETE THREAD LENGTH OF 1.750 INCHES.</p>		<p><b>INCH-POUND</b></p>	
<p>(K) DENOTES CHANGE(S)</p>			
<p>PREPARING ACTIVITY: IS CUSTODIANS: ARMY - AR AIR FORCE - 99</p>	<p>NAVY - AS</p>	<p><b>MILITARY SPECIFICATION SHEET</b></p> <p>TITLE SCREW, MACHINE, FLAT COUNTERSUNK HEAD.</p>	<p>SPECIFICATION SHEET NUMBER <b>MS24693</b> SUPERSEDING MS24693J 14 FEB 93</p> <p>28 MAR 93 REV K</p>

MS24693 REV K

9999932 0087777 476

<p>Form Approved OMB No. 0704-0188</p>																															
<p>8. <b>UNTHREADED PORTION:</b> THE DIAMETER OF THE UNTHREADED PORTION OF SCREWS SHALL NOT BE LESS THAN THE MINIMUM PITCH DIAMETER NOR MORE THAN THE MAXIMUM MAJOR DIAMETER OF THE THREAD.</p> <p>9. <b>MATERIAL IDENTIFICATION:</b> CORROSION RESISTANT STEEL SCREWS WITH NOMINAL SIZES 1/80 (#8) AND LARGER SHALL BE PERMANENTLY MARKED WITH ONE DASH (" - "). MARKING SHALL BE PLACED ON THE TOP OF HEAD AND INDENTED. METHOD AND SIZE OF MARKING SHALL CONFORM TO THE REQUIREMENTS FOR PERMANENT MARKINGS SPECIFIED IN SAE AS478.</p> <p>10. <b>POINTS:</b> SCREWS SHALL HAVE PLAIN SHEARED ENDS. HEADER POINTS ARE ACCEPTABLE IN ACCORDANCE WITH AMS B78.8.3.</p>																															
<p>(K) 11. <b>MATERIAL CODE:</b></p> <table border="0"> <tr> <td>"A"</td> <td>BEFORE DASH NUMBER</td> <td>- ANODIZED, ALUMINUM ALLOY SCREW.</td> </tr> <tr> <td>"B"</td> <td>BEFORE DASH NUMBER</td> <td>- UNCOATED, BRASS SCREW.</td> </tr> <tr> <td>"BB"</td> <td>BEFORE DASH NUMBER</td> <td>- BLACK CHEMICAL FINISH, BRASS SCREW.</td> </tr> <tr> <td>"C"</td> <td>BEFORE DASH NUMBER</td> <td>- CLEANED AND DESCALED, CORROSION RESISTANT STEEL SCREW.</td> </tr> <tr> <td>"CB"</td> <td>BEFORE DASH NUMBER</td> <td>- CADMIUM PLATED, BRASS SCREW.</td> </tr> <tr> <td>"N"</td> <td>BEFORE DASH NUMBER</td> <td>- UNCOATED, NICKLE-COPPER SCREW.</td> </tr> <tr> <td>"NB"</td> <td>BEFORE DASH NUMBER</td> <td>- NICKLE PLATED, BRASS SCREW.</td> </tr> <tr> <td>"S"</td> <td>BEFORE DASH NUMBER</td> <td>- CADMIUM PLATED, CARBON STEEL SCREW.</td> </tr> <tr> <td>"U"</td> <td>BEFORE DASH NUMBER</td> <td>- UNCOATED, COPPER-SILICON SCREW.</td> </tr> <tr> <td>"B"</td> <td>AFTER DASH NUMBER</td> <td>- BLACK OXIDE COATED, CORROSION RESISTANT STEEL SCREW.</td> </tr> </table>		"A"	BEFORE DASH NUMBER	- ANODIZED, ALUMINUM ALLOY SCREW.	"B"	BEFORE DASH NUMBER	- UNCOATED, BRASS SCREW.	"BB"	BEFORE DASH NUMBER	- BLACK CHEMICAL FINISH, BRASS SCREW.	"C"	BEFORE DASH NUMBER	- CLEANED AND DESCALED, CORROSION RESISTANT STEEL SCREW.	"CB"	BEFORE DASH NUMBER	- CADMIUM PLATED, BRASS SCREW.	"N"	BEFORE DASH NUMBER	- UNCOATED, NICKLE-COPPER SCREW.	"NB"	BEFORE DASH NUMBER	- NICKLE PLATED, BRASS SCREW.	"S"	BEFORE DASH NUMBER	- CADMIUM PLATED, CARBON STEEL SCREW.	"U"	BEFORE DASH NUMBER	- UNCOATED, COPPER-SILICON SCREW.	"B"	AFTER DASH NUMBER	- BLACK OXIDE COATED, CORROSION RESISTANT STEEL SCREW.
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"B"	AFTER DASH NUMBER	- BLACK OXIDE COATED, CORROSION RESISTANT STEEL SCREW.																													
<p>(K) 12. <b>PART NUMBER:</b></p>																															

## B.3.45 Screw MS51957-2, -3, -5, -7, -12, -13

The material and finish required by MS51957 is stainless steel with a passivation finish or black oxide.

**REQUIREMENTS:**

1. **MATERIAL:** Austenitic Corrosion-Resistant Steel screws shall be manufactured from Type 302 (UNS S30200), Type 304 (UNS S30400), Type 304L (UNS S30403), Type 305 (UNS S30500), Type 316 (UNS S31600), Type 316L (UNS S31603), Type 384 (UNS S38400), or Type XM-7 (UNS S30430) in accordance with chemical composition specified in QQ-S-763. (See Material Identification Marking and Material Code).
2. **FINISH:** Passivate in accordance with QQ-P-35 or Black Oxide coating (except for Type 316 or Type 316L) in accordance with MIL-C-13924, Class 4. (See Finish Code).
3. **MECHANICAL PROPERTIES:** The minimum tensile strength in load pounds, indicated for each size in Table I, is based on 80,000 PSI Minimum Tensile Strength. Load pounds are calculated by the stress areas indicated in FED-STD-H28/2. The yield strength, based on .2 percent offset, shall be 30,000 psi minimum.

2

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July 28, 2000 11:15:55

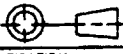
## B.3.46 Screw MS51958-124

The material and finish required by MS51958 is stainless steel with a passivation finish or black oxide.

1-3/4		3		579	
<p>* INDICATES MANUFACTURER'S NON-STOCK PRODUCTION ITEMS.          ** BASED ON 80,000 PSI MINIMUM TENSILE STRENGTH. LOAD POUNDS ARE CALCULATED BY THE STRESS AREAS INDICATED IN FED-STD-H28.</p>					
<b>REQUIREMENTS:-</b>					
1. <b>MATERIAL:</b> STEEL, CORROSION-RESISTING, 300 SERIES AS SPECIFIED IN QQ-S-763 AND FED-STD-46, COMPOSITION 304 OR 316 OR EQUAL TO OR INTERCHANGEABLE WITH 304/36 OR 304/6 CHROMIUM-NICKEL ALLOY STEEL.					
2. <b>PROTECTIVE COATING OR TREATMENT:</b> CLEANED AND DECALED IN ACCORDANCE WITH ASTM A380-76. BLACK OXIDE COATING IN ACCORDANCE WITH PROCEDURE SPECIFICATION WHEN BLACK OXIDE COATING IS REQUIRED, THE DASH NUMBER SHALL BE FOLLOWED BY A "B".					
3. <b>MAGNETIC PERMEABILITY:</b> THE SCREW SHALL MEET THE MAGNETIC PERMEABILITY REQUIREMENTS OF THE PROCUREMENT SPECIFICATION.					
4. <b>THREADS:</b> THREADS SHALL BE IN ACCORDANCE WITH FED-STD-H28/2.					
5. <b>RECESS:</b> THE RECESS SHALL BE IN ACCORDANCE WITH MS9006.					
6. <b>PART NUMBER:</b> THE PART NUMBER CONSISTS OF THE MS NUMBER PLUS THE DASH NUMBER AND CODE LETTER IF APPLICABLE (SEE REQ. 2). EXAMPLE: MS51958-45, CLEANED AND DECALED. MS51958-45B, BLACK OXIDE COATED.					
<b>NOTES:-</b>					
1. <b>DIMENSIONS:</b> ALL DIMENSIONS ARE IN INCHES.					
2. REFERENCED DOCUMENTS SHALL BE OF THE ISSUE IN EFFECT ON DATE OF INVITATIONS FOR BIDS, OR REQUEST FOR PROPOSAL EXCEPT THAT REFERENCED ADOPTED INDUSTRY DOCUMENTS SHALL GIVE THE DATE OF THE ISSUE ADOPTED.					
3. FOR DESIGN FEATURE PURPOSES, THIS STANDARD TAKES PRECEDENCE OVER PROCUREMENT DOCUMENTS REFERENCED HEREIN.					
(C) ENTIRE STANDARD REVISED					
P. A. AR		BY CONTRACT		TITLE	
Other Cont		AS		99	
SCREW, MACHINE PAN-HEAD, CROSS-RECESSED, CORROSION RESISTING STEEL, UNF-2A				MILITARY STANDARD <b>MS 51958</b>	

## B.3.47 Screw NAS662C2R3

The material and finish required by NAS662C2R3 is stainless steel with a passivation finish or black oxide.

.750		2-12	3-12										
<p>SCREWS LONGER THAN THOSE IN TABLE ARE AVAILABLE IN .125 INCH INCREMENTS BY USE OF SIGNIFICANT DASH NUMBER.</p> <p><b>MATERIAL:</b> CARBON STEEL (UNS K00802) PER AMS 5061. CORROSION RESISTANT STEEL 300 SERIES PER QQ-S-763 OR MIL-S-7720, OR 304 (UNS S30400) OR XH-7 (UNS S30430) PER ASTM A493. EXCEPT 80,000 PSI MINIMUM ULTIMATE STRENGTH</p> <p>BRASS (UNS C36000) PER ASTM B16 TEMPER H02 (10)</p> <p><b>FINISH:</b> CARBON STEEL - CAD PLATE PER QQ-P-416, TYPE II, CLASS 2. CORROSION RESISTANT STEEL - PASSIVATE PER QQ-P-35. BRASS - CADMIUM PLATE PER QQ-P-416, TYPE II, CLASS 2, YELLOW IRIDESCENT POST PLATE.</p>													
<p>LIST OF CURRENT SHEETS</p> <table border="1"> <tr> <th>SHT.</th> <th>REV.</th> </tr> <tr> <td>1</td> <td>10</td> </tr> <tr> <td>2</td> <td>1</td> </tr> </table>								SHT.	REV.	1	10	2	1
SHT.	REV.												
1	10												
2	1												
CUSTODIAN NATIONAL AEROSPACE STANDARDS COMMITTEE						THIRD ANGLE PROJECTION 							
PROCUREMENT SPECIFICATION NOTED		TITLE SCREW, MACHINE, FLATHEAD 100° PLAIN AND SELF-LOCKING				CLASSIFICATION STANDARD PART NAS662							
SHEET 1 OF 2													



Aerospace  
Industries  
Association

AIA/NAS NAS#662 94 ■ 0318743 0502179 506 ■  
NATIONAL AEROSPACE STANDARD

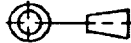
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<p>CODE: ADD "R" BEFORE SECOND DASH NUMBER FOR CRUCIFORM RECESS. SIZES .0040 AND .0090 ONLY MAY HAVE CRUCIFORM RECESS. (1)</p> <p>ADD "L" BEFORE SECOND DASH NUMBER FOR OPTIONAL SELF-LOCKING ELEMENT. "LL" FOR STRIP TYPE. "LP" FOR BUTTON TYPE OR "LP" FOR PATCH TYPE. OMIT FOR NON-SELF-LOCKING.</p> <p>ADD "C" BEFORE FIRST DASH NUMBER FOR CORROSION RESISTANT STEEL.</p> <p>ADD "B" BEFORE FIRST DASH NUMBER FOR BRASS.</p> <p>EXAMPLES OF PART NUMBERS:</p> <p>NAS662C384 - .0090-48 CORROSION RESISTANT STEEL SCREW .250 INCH LONG WITH CRUCIFORM RECESS (1)</p> <p>NAS662-3LEBA - .0090-48 STEEL SCREW .250 INCH LONG WITH CRUCIFORM RECESS AND OPTIONAL SELF-LOCKING ELEMENT. (1)</p> <p>NOTES: 1. "R" MINIMUM (5 THREAD PITCHES) - REGION OF MINIMUM ENGAGEMENT WITH FULL FORMER THREAD REQUIRED FOR OPTIMUM LOCKING.</p> <p>LENGTH OR DIAMETER OF LOCKING ELEMENT MAY BE MORE OR LESS THAN "R" PROVIDING ALL OTHER</p>
--

## B.3.48 Washer NAS620C2

The material and finish required by NAS620C2 is stainless steel with a passivation finish or black oxide.

		1/4 (2500)	1/2 (416)	3/4 (625)	1 (800)	1 1/2 (1200)								
<b>MATERIAL:</b>		LOW CARBON STEEL SHEET OR STRIP IN ACCORDANCE WITH QQ-S-808, COLD ROLLED COMMERCIAL QUALITY, NO. 1 FULL HARD TEMPER OR NO. 2 HALF-HARD TEMPER, NO. 3 FINISH. 6062 ALUMINUM ALLOY SHEET IN ACCORDANCE WITH QQ-A-250/8 (UNS A90502), TEMPER H32 OR TEMPER H34. COMMERCIAL BRASS SHEET OR STRIP IN ACCORDANCE WITH ASTM B36 OR ASTM B121, HALF-HARD TEMPER CORROSION-RESISTANT STEEL SHEET OR STRIP IN ACCORDANCE WITH QQ-S-766, ANY OF THE 300 SERIES, CONDITION A FINISH 2D OR 2B (FOR SHEET), FINISH 2 (FOR STRIP).												
<b>FINISH:</b>		LOW CARBON STEEL - CADMIUM PLATE IN ACCORDANCE WITH QQ-P-416, TYPE II, CLASS 2. ALUMINUM ALLOY - NONE. BRASS - CADMIUM PLATE IN ACCORDANCE WITH QQ-P-416, TYPE II, CLASS 2. CADMIUM PLATED BRASS WASHERS ARE TO BE DYED A LIGHT BLUE COLOR WHICH WILL NOT RUB OFF OR BE SMEARED BY CONTACT INCIDENTAL TO HANDLING AND SERVICE, AND SHALL NOT BE INJURIOUS TO THE MATERIAL.												
		<table border="1"> <thead> <tr> <th colspan="2">LIST OF CURRENT SHEETS</th> </tr> <tr> <th>NO.</th> <th>REV.</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>5</td> </tr> <tr> <td>2</td> <td>1</td> </tr> </tbody> </table>					LIST OF CURRENT SHEETS		NO.	REV.	1	5	2	1
LIST OF CURRENT SHEETS														
NO.	REV.													
1	5													
2	1													
⑤ COMPLETELY REVISED														
CUSTODIAN		NATIONAL AEROSPACE STANDARDS COMMITTEE			THIRD ANGLE PROJECTION 									
PROCUREMENT SPECIFICATION	TITLE			CLASSIFICATION										
NONE	WASHER, FLAT - REDUCED OUTSIDE DIAMETER			STANDARD PART										
				NAS 620										
				SHEET 1 OF 2										

USE OF OR RELIANCE UPON THIS DOCUMENT OR ANY NATIONAL AEROSPACE STANDARD IS ENTIRELY VOLUNTARY. AIA DOES NOT QUALIFY SUPPLIERS OR CERTIFY CONFORMANCE OF ITEMS PROCURED UNDER NATIONAL AEROSPACE STANDARDS. AIA MAKES NO REPRESENTATION OR CLAIM RESPECTING (1) THE SUITABILITY OF ITEMS FOR ANY PARTICULAR APPLICATION, OR (2) THE EXISTENCE OF OR APPLICABILITY HERETO OF PATENT OR TRADEMARK RIGHTS.

AIA/NAS NAS-620 92 0316743 0500821 281



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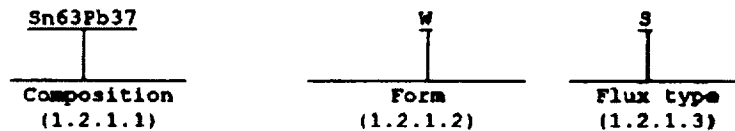
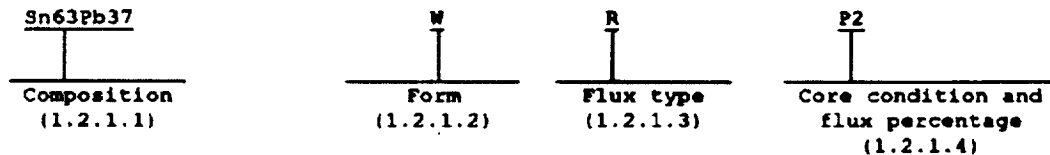
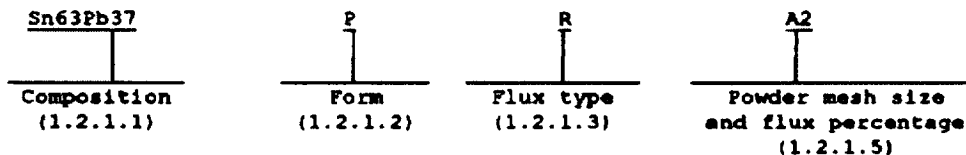
<b>FINISH:</b>	CORROSION RESISTANT STEEL - PASSIVATE IN ACCORDANCE WITH QQ-P-35. - BLACK OXIDE COAT PER MIL-C-13024										
<b>MATERIAL CODE:</b>	"L" - LOW CARBON STEEL "A" - ALUMINUM ALLOY "B" - BRASS "C" - CORROSION-RESISTANT STEEL										
<b>FINISH CODE:</b>	"P" - INDICATES BLACK OXIDE COATED FOR CORROSION-RESISTANT STEEL ONLY. FIRST DASH NUMBER DESIGNATES SCREW SIZE. "L" CODING IN TABLE IDENTIFIES THE LIGHT SERIES OF WASHERS.										
<b>EXAMPLES OF PART NUMBERS:</b> <table border="0"> <tr> <td>NAS620</td> <td>C</td> <td>10L</td> <td>P</td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td>FINISH CODE</td> </tr> </table>		NAS620	C	10L	P						FINISH CODE
NAS620	C	10L	P								
				FINISH CODE							

## B.3.49 – B.3.54

PARA #	DESCRIPTION	PART NUMBER	REASON
B.3.49	solder	*10-P34028D001	all tin-lead solders contain at least 4% lead (Q-SS-571)
B.3.50	solder	SN62WRMAP3	
B.3.51	solder	SN62WRP3	
B.3.52	solder	SN63WRMAP3	
B.3.53	solder	SN63WRP3	
B.3.54	solder	SN96WRP3	

\*Document is no longer available. Solder is not believed to be a risk because the TDRSS IV program does not use pure tin solders.

QQ-S-571F ■■■ 9999974 0164765 368 ■■■  
QQ-S-571F

Solid solder (no flux)Flux-cored solderSolder paste

1.2.1.1 Composition. The composition is identified by a two-letter symbol(s) and a number. The letters represent the chemical symbol for all major component metallic elements in the solder. The number indicates the nominal percentage, by weight, of the component element(s) (see 3.2.1).

## B.3.55 – B.3.68

These 'as required' part numbers are not a pure tin risk.

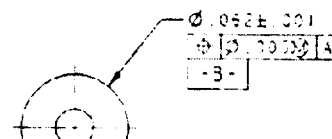
PARA #	DESCRIPTION	PART NUMBER	REASON
B.3.55	Insulating compound	11-P34005D001	ALL AS REQUIRED ITEMS  NO FINISH (tin or otherwise)
B.3.56	Adhesive	11-P34009D002	
B.3.57	Adhesive	11-P34010D202	
B.3.58	Adhesive	11-P34011D002	
B.3.59	Paint	11-P34023D001	
B.3.60	Primer	11-P34024D001	
B.3.61	Primer/Rubber	11-P34026D001 11-P34026D200	
B.3.62	Ink	11-P34036D001 11-P34036D002	
B.3.63	Epoxy	11-P34046D002	
B.3.64	Epoxy	11-P34049D002	
B.3.65	Adhesive	11-P34067D001	
B.3.66	Adhesive	11-P34068D001 11-P34068D002	
B.3.67	Tape	11-P34070D001	
B.3.68	Adhesive	11-P34090D001	

## B.3.69 Insulator 14-P40053E001

There is no finishon this part per Motorola drawing (14-P40053E)

## NOTES:

1. INTERPRET DRAWING PER STANDARDS LISTED IN MIL-STD-100.
2. INTERPRET DIMENSIONS AND TOLERANCES PER ANSI Y14.5M - 1982.
3. MATERIAL: PLASTIC ROD, POLYTETRAFLUOROETHYLENE, TYPE 1, GRADE 1, PER ASTM D1720-91A.
4. PACKAGE TO ENSURE PROTECTION FROM CONTAMINATION AND/OR DAMAGE RESULTING FROM HANDLING, STORAGE OR SHIPPING. IDENTIFICATION SHALL BE PER NOTE 5.
5. THE PART NUMBER, 14-P40053E001, REVISION LEVEL, AND THE MANUFACTURER'S IDENTITY SHALL APPEAR ON OR IN THE MINIMUM PROTECTIVE PACKAGE PER MIL-STD-130.



## Appendix B.4

# TDRSS IV Mechanical Parts Summary by Assembly

PTI CD	PART NUMBER	Part Type	PART VALUE	Make - Buy	Qty/ Assy	Assy
2	MS35649-244	NUT	.1120-40	BUY	1	TRANSMITTER POWER CONV.
2	NAS671C0	HEX NUT,#0	.0600-80 X .047THK	BUY	1	POWER AMPLIFIER ASSEMBLY
2	NAS671C2	HEX NUT,#2	.0860-56 X .061THK	BUY	1	PROGRAMMING CONNECTOR
2	NAS671C4	HEX NUT,#4	.1120-40 X .061THK	BUY	1	POWER AMPLIFIER ASSEMBLY
3	03-P40020E001	BOLT, STACK XPND	Jun-32	BUY	1	TRANSPONDER
3	MS24693-C2	SCREW		BUY	1	POWER AMPLIFIER ASSEMBLY
3	MS24693-C2	SCREW		BUY	1	TRANSMITTER POWER CONV.
3	MS51957-12	SCREW	CROSS-REC, #4-40 X .188	BUY	1	TRANSPONDER
3	MS51957-13	SCREW	CROSS-REC, #4-40 X .250	BUY	1	TRANSMITTER POWER CONV.
3	MS51957-2	SCREW	CROSS-REC, #2-56 X .188	BUY	1	DIGITAL PROCESSOR
3	MS51957-2	SCREW	CROSS-REC, #2-56 X .188	BUY	1	POWER AMPLIFIER ASSEMBLY
3	MS51957-2	SCREW	CROSS-REC, #2-56 X .188	BUY	1	RECEIVER POWER CONVERTER
3	MS51957-2	SCREW	CROSS-REC, #2-56 X .188	BUY	1	RECEIVER RF MODULE ASSY
3	MS51957-2	SCREW	CROSS-REC, #2-56 X .188	BUY	1	TRANSMITTER POWER CONV.
3	MS51957-2	SCREW	CROSS-REC, #2-56 X .188	BUY	1	TRANSPONDER
3	MS51957-3	SCREW	CROSS-REC, #2-56 X .250	BUY	1	DIGITAL PROCESSOR
3	MS51957-5	SCREW	CROSS-REC, #2-56 X .375	BUY	1	DIGITAL PROCESSOR
3	MS51957-7	SCREW	CROSS-REC, #2-56 X .500	BUY	1	PROGRAMMING CONNECTOR
3	MS51958-124	SCREW	.0600-80X.3750	BUY	1	POWER AMPLIFIER ASSEMBLY
3	NAS662C2R3	SCREW,FLATHEAD,#2	.0860-56 X .188	BUY	1	DIGITAL PROCESSOR
3	NAS662C2R3	SCREW,FLATHEAD,#2	.0860-56 X .188	BUY	1	POWER AMPLIFIER ASSEMBLY
3	NAS662C2R3	SCREW,FLATHEAD,#2	.0860-56 X .188	BUY	1	RECEIVER RF MODULE ASSY

PTI CD	PART NUMBER	Part Type	PART VALUE	Make - Buy	Qty/ Assy	Assy
3	NAS662C2R3	SCREW,FLATHEAD,#2	.0860-56 X .188	BUY	1	TRANSMITTER POWER CONV.
3	NAS662C2R3	SCREW,FLATHEAD,#2	.0860-56 X .188	BUY	1	UPCONVERTER ASSEMBLY
4	NAS620C2	WASHER,FLAT,#2	.0860 X .032THK	BUY	1	DIGITAL PROCESSOR
4	NAS620C2	WASHER,FLAT,#2	.0860 X .032THK	BUY	1	RECEIVER POWER CONVERTER
4	NAS620C2	WASHER,FLAT,#2	.0860 X .032THK	BUY	1	RECEIVER RF MODULE ASSY
4	NAS620C2	WASHER,FLAT,#2	.0860 X .032THK	BUY	1	TRANSMITTER POWER CONV.
7	07-P40073E001	COMP. FRAME		BUY	1	DIGITAL PROCESSOR
7	07-P40090E001	FRAME, XMTR P.C		BUY	1	TRANSMITTER POWER CONV.
7	07-P40110E001	FRAME,RCVR POWER	CONVERTER	BUY	1	RECEIVER POWER CONVERTER
7	07-P40130E001	FRAME,UPCONVERTER		BUY	1	UPCONVERTER ASSEMBLY
7	07-P40143E001	BRACKET, RECEIVER RF		BUY	1	RECEIVER RF MODULE ASSY
7	07-P40150E001	FRAME, RECEIVER RF		BUY	1	RECEIVER RF MODULE ASSY
7	07-P45529E001	FRAME, DIGITAL PROCESSOR		BUY	1	DIGITAL PROCESSOR
10	10-P34028D001	SOLDER		BUY	1	DIGITAL PROCESSOR
10	10-P34028D001	SOLDER		BUY	1	RECEIVER POWER CONVERTER
10	10-P34028D001	SOLDER		BUY	1	RECEIVER RF MODULE ASSY
10	10-P34028D001	SOLDER		BUY	1	TCXO PWB ASSEMBLY
10	10-P34028D001	SOLDER		BUY	1	TRANSMITTER POWER CONV.
10	10-P34028D001	SOLDER		BUY	1	UPCONVERTER ASSEMBLY
10	SN62WRMAP3	SOLDER, WIRE	3.3 PCT MILDLY ACTIVATED ROSIN	BUY	1	DIGITAL PROCESSOR
10	SN62WRMAP3	SOLDER, WIRE	3.3 PCT MILDLY ACTIVATED ROSIN	BUY	1	POWER AMPLIFIER ASSEMBLY
10	SN62WRMAP3	SOLDER, WIRE	3.3 PCT MILDLY ACTIVATED ROSIN	BUY	1	RECEIVER POWER CONVERTER
10	SN62WRMAP3	SOLDER, WIRE	3.3 PCT MILDLY ACTIVATED ROSIN	BUY	1	RECEIVER RF MODULE ASSY
10	SN62WRMAP3	SOLDER, WIRE	3.3 PCT MILDLY ACTIVATED ROSIN	BUY	1	TCXO PWB ASSEMBLY
10	SN62WRMAP3	SOLDER, WIRE	3.3 PCT MILDLY ACTIVATED ROSIN	BUY	1	TRANSMITTER POWER CONV.



PTI CD	PART NUMBER	Part Type	PART VALUE	Make - Buy	Qty/ Assy	Assy
10	SN62WRMAP3	SOLDER, WIRE	3.3 PCT MILDLY ACTIVATED ROSIN	BUY	1	UPCONVERTER ASSEMBLY
10	SN62WRP3	SOLDER		BUY	1	DIGITAL PROCESSOR
10	SN62WRP3	SOLDER		BUY	1	POWER AMPLIFIER ASSEMBLY
10	SN63WRMAP3	SOLDER, WIRE	3.3 PCT MILDLY ACTIVATED ROSIN	BUY	1	ASSY, FLEXIBLE DC POWER
10	SN63WRMAP3	SOLDER, WIRE	3.3 PCT MILDLY ACTIVATED ROSIN	BUY	1	DIGITAL PROCESSOR
10	SN63WRMAP3	SOLDER, WIRE	3.3 PCT MILDLY ACTIVATED ROSIN	BUY	1	POWER AMPLIFIER ASSEMBLY
10	SN63WRMAP3	SOLDER, WIRE	3.3 PCT MILDLY ACTIVATED ROSIN	BUY	1	PROGRAMMING CONNECTOR
10	SN63WRMAP3	SOLDER, WIRE	3.3 PCT MILDLY ACTIVATED ROSIN	BUY	1	RECEIVER POWER CONVERTER
10	SN63WRMAP3	SOLDER, WIRE	3.3 PCT MILDLY ACTIVATED ROSIN	BUY	1	RECEIVER RF MODULE ASSY
10	SN63WRMAP3	SOLDER, WIRE	3.3 PCT MILDLY ACTIVATED ROSIN	BUY	1	TCXO PWB ASSEMBLY
10	SN63WRMAP3	SOLDER, WIRE	3.3 PCT MILDLY ACTIVATED ROSIN	BUY	1	TRANSMITTER POWER CONV.
10	SN63WRMAP3	SOLDER, WIRE	3.3 PCT MILDLY ACTIVATED ROSIN	BUY	1	TRANSPONDER
10	SN63WRMAP3	SOLDER, WIRE	3.3 PCT MILDLY ACTIVATED ROSIN	BUY	1	UPCONVERTER ASSEMBLY
10	SN63WRP3	SOLDER, WIRE	3.3 PCT ROSIN	BUY	1	DIGITAL PROCESSOR
10	SN63WRP3	SOLDER, WIRE	3.3 PCT ROSIN	BUY	1	POWER AMPLIFIER ASSEMBLY
10	SN63WRP3	SOLDER, WIRE	3.3 PCT ROSIN	BUY	1	RECEIVER POWER CONVERTER
10	SN63WRP3	SOLDER, WIRE	3.3 PCT ROSIN	BUY	1	RECEIVER RF MODULE ASSY
10	SN63WRP3	SOLDER, WIRE	3.3 PCT ROSIN	BUY	1	TCXO PWB ASSEMBLY
10	SN63WRP3	SOLDER, WIRE	3.3 PCT ROSIN	BUY	1	TRANSMITTER POWER CONV.
10	SN63WRP3	SOLDER, WIRE	3.3 PCT ROSIN	BUY	1	UPCONVERTER ASSEMBLY
10	SN96WRP3	SOLDER, WIRE	3.3 PCT ROSIN	BUY	1	POWER AMPLIFIER ASSEMBLY
11	11-P34005D001	COMPOUND,INSULATING	RE-2038/HD3475	BUY	1	DIGITAL PROCESSOR
11	11-P34005D001	COMPOUND,INSULATING	RE-2038/HD3475	BUY	1	POWER AMPLIFIER ASSEMBLY
11	11-P34005D001	COMPOUND,INSULATING	RE-2038/HD3475	BUY	1	RECEIVER POWER CONVERTER
11	11-P34005D001	COMPOUND,INSULATING	RE-2038/HD3475	BUY	1	RECEIVER RF MODULE ASSY

PTI CD	PART NUMBER	Part Type	PART VALUE	Make - Buy	Qty/ Assy	Assy
11	11-P34005D001	COMPOUND,INSULATING	RE-2038/HQ3475	BUY	1	TRANSMITTER POWER CONV.
11	11-P34009D002	ADHESIVE	2216 2% CAB-O-SIL	BUY	1	ASSY, FLEXIBLE DC POWER
11	11-P34009D002	ADHESIVE	2216 2% CAB-O-SIL	BUY	1	DIGITAL PROCESSOR
11	11-P34009D002	ADHESIVE	2216 2% CAB-O-SIL	BUY	1	POWER AMPLIFIER ASSEMBLY
11	11-P34009D002	ADHESIVE	2216 2% CAB-O-SIL	BUY	1	PROGRAMMING CONNECTOR
11	11-P34009D002	ADHESIVE	2216 2% CAB-O-SIL	BUY	1	RECEIVER POWER CONVERTER
11	11-P34009D002	ADHESIVE	2216 2% CAB-O-SIL	BUY	1	RECEIVER RF MODULE ASSY
11	11-P34009D002	ADHESIVE	2216 2% CAB-O-SIL	BUY	1	TCXO PWB ASSEMBLY
11	11-P34009D002	ADHESIVE	2216 2% CAB-O-SIL	BUY	1	TRANSMITTER POWER CONV.
11	11-P34009D002	ADHESIVE	2216 2% CAB-O-SIL	BUY	1	TRANSPONDER
11	11-P34009D002	ADHESIVE	2216 2% CAB-O-SIL	BUY	1	UPCONVERTER ASSEMBLY
11	11-P34010D202	ADHESIVE		BUY	1	DIGITAL PROCESSOR
11	11-P34011D002	ADHESIVE,3% CAB-O-SIL		BUY	1	DIGITAL PROCESSOR
11	11-P34011D002	ADHESIVE,3% CAB-O-SIL		BUY	1	POWER AMPLIFIER ASSEMBLY
11	11-P34011D002	ADHESIVE,3% CAB-O-SIL		BUY	1	RECEIVER POWER CONVERTER
11	11-P34011D002	ADHESIVE,3% CAB-O-SIL		BUY	1	TCXO PWB ASSEMBLY
11	11-P34023D001	PAINT		BUY	1	TRANSPONDER
11	11-P34024D001	PRIMER		BUY	1	TRANSPONDER
11	11-P34026D001	RUBBER, SILICONE, HIGH	LOSS	BUY	1	POWER AMPLIFIER ASSEMBLY
11	11-P34026D200	PRIMER		BUY	1	POWER AMPLIFIER ASSEMBLY
11	11-P34036D001	INK, BLK	BLACK	BUY	1	ASSY, FLEXIBLE DC POWER
11	11-P34036D001	INK, BLK	BLACK	BUY	1	DIGITAL PROCESSOR
11	11-P34036D001	INK, BLK	BLACK	BUY	1	POWER AMPLIFIER ASSEMBLY
11	11-P34036D001	INK, BLK	BLACK	BUY	1	PROGRAMMING CONNECTOR
11	11-P34036D001	INK, BLK	BLACK	BUY	1	RECEIVER POWER CONVERTER

PTI CD	PART NUMBER	Part Type	PART VALUE	Make - Buy	Qty/ Assy	Assy
11	11-P34036D001	INK, BLK	BLACK	BUY	1	RECEIVER RF MODULE ASSY
11	11-P34036D001	INK, BLK	BLACK	BUY	1	TCXO PWB ASSEMBLY
11	11-P34036D001	INK, BLK	BLACK	BUY	1	TRANSMITTER POWER CONV.
11	11-P34036D001	INK, BLK	BLACK	BUY	1	UPCONVERTER ASSEMBLY
11	11-P34036D002	INK	WHITE	BUY	1	DIGITAL PROCESSOR
11	11-P34036D002	INK	WHITE	BUY	1	RECEIVER POWER CONVERTER
11	11-P34036D002	INK	WHITE	BUY	1	RECEIVER RF MODULE ASSY
11	11-P34036D002	INK	WHITE	BUY	1	TCXO PWB ASSEMBLY
11	11-P34036D002	INK	WHITE	BUY	1	TRANSMITTER POWER CONV.
11	11-P34036D002	INK	WHITE	BUY	1	TRANSPONDER
11	11-P34036D002	INK	WHITE	BUY	1	UPCONVERTER ASSEMBLY
11	11-P34046D002	EPOXY ADHESIVE	293-1, 2%	BUY	1	DIGITAL PROCESSOR
11	11-P34046D002	EPOXY ADHESIVE	293-1, 2%	BUY	1	RECEIVER POWER CONVERTER
11	11-P34046D002	EPOXY ADHESIVE	293-1, 2%	BUY	1	RECEIVER RF MODULE ASSY
11	11-P34046D002	EPOXY ADHESIVE	293-1, 2%	BUY	1	TRANSMITTER POWER CONV.
11	11-P34046D002	EPOXY ADHESIVE	293-1, 2%	BUY	1	UPCONVERTER ASSEMBLY
11	11-P34049D002	EPOXY ADHESIVE, CONDUCT.		BUY	1	DIGITAL PROCESSOR
11	11-P34049D002	EPOXY ADHESIVE, CONDUCT.		BUY	1	RECEIVER POWER CONVERTER
11	11-P34049D002	EPOXY ADHESIVE, CONDUCT.		BUY	1	RECEIVER RF MODULE ASSY
11	11-P34049D002	EPOXY ADHESIVE, CONDUCT.		BUY	1	TRANSMITTER POWER CONV.
11	11-P34049D002	EPOXY ADHESIVE, CONDUCT.		BUY	1	UPCONVERTER ASSEMBLY
11	11-P34067D001	ADHESIVE	URALANE 7762	BUY	1	DIGITAL PROCESSOR
11	11-P34067D001	ADHESIVE	URALANE 7762	BUY	1	RECEIVER POWER CONVERTER
11	11-P34067D001	ADHESIVE	URALANE 7762	BUY	1	TRANSMITTER POWER CONV.
11	11-P34068D001	ADHESIVE, EPOXY		BUY	1	RECEIVER RF MODULE ASSY

PTI CD	PART NUMBER	Part Type	PART VALUE	Make - Buy	Qty/ Assy	Assy
11	11-P34068D001	ADHESIVE,EPOXY		BUY	1	TCXO PWB ASSEMBLY
11	11-P34068D002	ADHESIVE		BUY	1	UPCONVERTER ASSEMBLY
11	11-P34070D001	TAPE,ELECTRICAL	POLYIMIDE	BUY	1	RECEIVER RF MODULE ASSY
11	11-P34090D001	ADHESIVE, ABLEFILM	ECF 563	BUY	1	POWER AMPLIFIER ASSEMBLY
11	11-P34090D001	ADHESIVE, ABLEFILM	ECF 563	BUY	1	RECEIVER RF MODULE ASSY
11	11-P34090D001	ADHESIVE, ABLEFILM	ECF 563	BUY	1	UPCONVERTER ASSEMBLY
14	14-P40053E001	INSULATOR		BUY	1	POWER AMPLIFIER ASSEMBLY
14	14-P40053E001	INSULATOR		BUY	1	RECEIVER RF MODULE ASSY
15	15-P40023E001	COVER, WIREWAY XNDR		BUY	1	TRANSPONDER
15	15-P40038E001	COVER, PROGRAMMING	CONNECTOR	BUY	1	PROGRAMMING CONNECTOR
15	15-P40039E001	COVER, TOP		BUY	1	TRANSPONDER
15	15-P40050E001	HOUSING, POWER AMPLIFIER		BUY	1	POWER AMPLIFIER ASSEMBLY
15	15-P40051E001	COVER,POWER AMPLIFIER		BUY	1	POWER AMPLIFIER ASSEMBLY
15	15-P40052E001	COVER, WIREWAY	POWER AMPLIFIER	BUY	1	POWER AMPLIFIER ASSEMBLY
15	15-P40071E001	COVER,DIGITAL PROCESSOR		BUY	1	DIGITAL PROCESSOR
15	15-P40091E001	COVER, XMTR POWER	CONVERTER	BUY	1	TRANSMITTER POWER CONV.
15	15-P40131E001	COVER,UPCONVERTER		BUY	1	UPCONVERTER ASSEMBLY
15	15-P40151E002	COVER, RECEIVER RF		BUY	1	RECEIVER RF MODULE ASSY
29	29-P40037E001	TERMINAL STRIP		BUY	1	PROGRAMMING CONNECTOR
30	30-P34069D126A	WIRE,MAGNET	NO.26 RED	BUY	18	LINE MAKE INDUCTOR
30	30-P34069D130A	WIRE,MAGNET	NO.30 RED	BUY	6	LINE MAKE INDUCTOR
30	30-P34069D132A	WIRE,MAGNET	NO.32 RED	BUY	4	LINE MAKE INDUCTOR
30	30-P34069D134A	WIRE,MAGNET	NO.34 RED	BUY	21	LINE MAKE INDUCTOR
30	30-P34069D634C	WIRE, MAGNET	NO. 34 BIFILAR	BUY	2	LINE MAKE INDUCTOR
30	30-P34073D001	FOIL,COPPER	0.001	BUY	1	POWER AMPLIFIER ASSEMBLY

PTI CD	PART NUMBER	Part Type	PART VALUE	Make - Buy	Qty/ Assy	Assy
30	30-P34073D001	FOIL,COPPER	0.001	BUY	1	RECEIVER POWER CONVERTER
30	30-P34073D001	FOIL,COPPER	0.001	BUY	9	RECEIVER RF MODULE ASSY
30	30-P34073D001	FOIL,COPPER	0.001	BUY	15	TCXO PWB ASSEMBLY
30	30-P34073D001	FOIL,COPPER	0.001	BUY	1	TRANSMITTER POWER CONV.
30	30-P34073D001	FOIL,COPPER	0.001	BUY	27	UPCONVERTER ASSEMBLY
30	30-P40025E001	ASSY, FLEXIBLE DC POWER		MAKE	1	TRANSPONDER
30	30-P40035E001	COAXIAL CABLE ASSY, RF		BUY	1	TRANSPONDER
30	84-P40027E001	PWB, FLEXIBLE		BUY	1	ASSY, FLEXIBLE DC POWER
30	M22759/44-26-9	WIRE	NO.26 WHT	BUY	1	POWER AMPLIFIER ASSEMBLY
30	M22759/44-26-9	WIRE	NO.26 WHT	BUY	1	RECEIVER RF MODULE ASSY
30	M81822/13-A26-9	WIRE	#26 WHITE	BUY	1	POWER AMPLIFIER ASSEMBLY
30	M81822/13-A26-9	WIRE	#26 WHITE	BUY	1	RECEIVER POWER CONVERTER
30	M81822/13-A26-9	WIRE	#26 WHITE	BUY	1	RECEIVER RF MODULE ASSY
30	M81822/13-A26-9	WIRE	#26 WHITE	BUY	1	TRANSMITTER POWER CONV.
30	M81822/13-A30-9	WIRE	#30 WHT	BUY	1	ASSY, FLEXIBLE DC POWER
30	M81822/13-A30-9	WIRE	#30 WHT	BUY	1	DIGITAL PROCESSOR
30	M81822/13-A30-9	WIRE	#30 WHT	BUY	1	RECEIVER RF MODULE ASSY
30	M81822/13-A30-9	WIRE	#30 WHT	BUY	1	TCXO PWB ASSEMBLY
30	M81822/13-A30-9	WIRE	#30 WHT	BUY	1	TRANSMITTER POWER CONV.
30	M81822/13-A30-9	WIRE	#30 WHT	BUY	1	UPCONVERTER ASSEMBLY
32	1004-2561-1215	GASKET		BUY	1	POWER AMPLIFIER ASSEMBLY
32	1004-2561-1215	GASKET		BUY	1	RECEIVER RF MODULE ASSY
32	1004-2561-1215	GASKET		BUY	1	UPCONVERTER ASSEMBLY
37	M23053/18-101-C	INSULATION SLEEVING	.046 CLR	BUY	1	TCXO PWB ASSEMBLY
37	M23053/18-102-C	INSULATION SLEEVING	.062 CLR	BUY	1	TCXO PWB ASSEMBLY

PTI CD	PART NUMBER	Part Type	PART VALUE	Make - Buy	Qty/ Assy	Assy
46	46-P40072E001	BLOCK,SPACER		BUY	1	DIGITAL PROCESSOR
46	46-P40152E001	BLOCK, SPACER		BUY	1	RECEIVER RF MODULE ASSY
64	64-P40022E001	SHEAR PANEL, TRANSPONDER		BUY	1	TRANSPONDER
74	74-P16553A027	FORM,COIL-TOROIDAL		BUY	22	LINE MAKE INDUCTOR
74	74-P16553A033	FORM, COIL		BUY	3	LINE MAKE INDUCTOR
74	74-P16553A077	FORM,COIL-TOROIDAL		BUY	1	LINE MAKE INDUCTOR
74	74-P32317M001	COIL FORM	2843002402	BUY	1	LINE MAKE INDUCTOR
74	74-P32317M002	COIL FORM	2843002302	BUY	1	LINE MAKE INDUCTOR
84	84-P40034A007	CIRCUIT INTERRUPT PAD		BUY	1	RECEIVER POWER CONVERTER
84	84-P40034A007	CIRCUIT INTERRUPT PAD		BUY	1	RECEIVER RF MODULE ASSY
84	84-P40034A007	CIRCUIT INTERRUPT PAD		BUY	1	TRANSMITTER POWER CONV.
84	84-P40034A007	CIRCUIT INTERRUPT PAD		BUY	1	UPCONVERTER ASSEMBLY
84	84-P40034A050	CIP		BUY	1	RECEIVER RF MODULE ASSY
84	84-P40034A050	CIP		BUY	1	TRANSMITTER POWER CONV.
84	84-P40034A050	CIP		BUY	1	UPCONVERTER ASSEMBLY
84	84-P40042E001	PRINTED CIRCUIT BOARD,	STRIP LINE FILTER	BUY	1	POWER AMPLIFIER ASSEMBLY
84	84-P40045E001	PRINTED CIRCUIT BOARD,	POWER AMPLIFIER	BUY	1	POWER AMPLIFIER ASSEMBLY
84	84-P40082E001	PWB, XMTR PWR CONVERTER		BUY	1	TRANSMITTER POWER CONV.
84	84-P40102E001	PRINTED WIRING BOARD	RCVR PWR CONVERTER	BUY	1	RECEIVER POWER CONVERTER
84	84-P40122E001	PRINTED CIRCUIT BOARD	UPCONVERTER	BUY	1	UPCONVERTER ASSEMBLY
84	84-P40142E001	PRINTED CIRCUIT BOARD	RECEIVER RF	BUY	1	RECEIVER RF MODULE ASSY
84	84-P40202E001	PWB, TXCO ASSEMBLY		BUY	1	TCXO PWB ASSEMBLY
84	84-P45527E001	PWB DIGITAL PROCESSOR		BUY	1	DIGITAL PROCESSOR